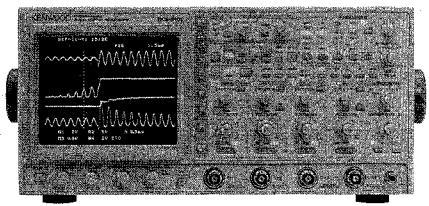
KENWOOD

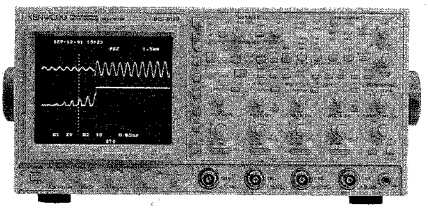
PROGRAMMABLE DIGITAL STORAGE OSCILLOSCOPE

DCS-9100
DCS-9120

SERVICE MANUAL

KENWOOD CORPORATION





WARNING

The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

CONTENTS

SPECIFICATIONS 3
SAFETY 11
CIRCUIT DESCRIPTION 12
BLOCK DIAGRAM 22
ADJUSTMENT 24
TROUBLESHOOTING 46
PARTS LIST 80
DISASSEMBLY 81
PARTS LIST (ELECTRICAL) 84
SCHEMATIC DIAGRAM 108
P.C. BOARD 122
SEMICONDUCTORS 132

SPECIFICATIONS

【Real-Time Oscilloscope Section】

CRT	
Type	150mm rectangular with internal graticule
Acceleration voltage	17kV
Display area	8 div.×10 div. (1 div.=10mm)
Vertical axis (CH1, CH2, CH3 & CH4)	
Sensitivity	5mV/div. to 5V/div. ±2% (10 to 35℃) 1mV/div., 2mV/div. ±4% (10 to 35℃)
Attenuator	1mV/div. to 5V/div., 1-2-5 steps, 12 ranges, ranges fine-adjustable
Input impedance	1MΩ±1%, 23pF±3pF
Frequency response DC:	DC to 100MHz, within -3dB (5mV/div. to 5V/div.) DC to 20MHz, within -3dB (1mV/div., 2mV/div.)
AC:	5Hz to 100MHz, within -3dB (5mV/div. to 5V/div.) 5Hz to 20MHz, within -3dB (1mV/div., 2mV/div.)
Rise time	3.5ns or less (5mV/div. to 5V/div.) 17.5ns or less (1mV/div., 2mV/div.)
Signal delay time	10ns or more (Delay time on CRT screen)
Cross-talk	-40 dB or less (with 1kHz sine wave input)
Operation modes CH1 :	CH1 single-trace and 2- to 4-trace display combined with other channel (s)
CH2 :	CH2 single-trace and 2- to 4-trace display combined with other channel (s)
CH3 :	CH3 single-trace and 2- to 4-trace display combined with other channel (s)
CH4 :	CH4 single-trace and 2- to 4-trace display combined with other channel (s)
ADD :	CH1 + (±CH2) or CH3 + (±CH4) added waveform and 2- to 4-trace display combination with other channel (s)
ALT :	Alternate method signal display
CHOP:	Chop method signal display
Polarity reversal	Applrcable to CH2 and CH4.
Bandwidth limiting	Approx. 20MHz -3dB
Chopping frequency	Approx. 500kHz
Inter-channel delay time difference	Between CH1 and CH4: 0.5ns or less
Max. undistorted amplitude	8div. or more (DC to 100MHz)
⚠Max. input withstand voltage	800Vp-p or 400V (DC+AC peak)

SPECIFICATIONS

Horizontal axis	
Operation modes	X-Y mode is switched with HORIZONTAL MODE. Y-axis: CH1 to CH4 and ADD X-axis: Selectable with trigger source. (CH1 to CH4)
Sensitivity	Same as vertical axis.
Input impedance	Same as vertical axis.
Frequency response DC	DC to 2MHz, within -3db
AC	5Hz to 2MHz, within -3db
X-Y phase difference	3° or less at 100kHz
⚠Max. input withstand voltage	Same as vertical axis.

Sweep	
Sweep method A	A sweep
A INT B	Simultaneous intensified B sweep during A sweep
ALT	Alternate A (A INT B) sweep and B sweep
B	B sweep
X-Y	X-Y oscilloscope operation
Sweep time A	20ns/div. to 0.5s/div. ±2% (10 to 35℃), 1-2-5 steps, 23 ranges, ranges fine-adjustable
B	20ns/div. to 50ms/div ±2% (10 to 35℃), 1-2-5 steps, 20 ranges
Sweep magnification	×10±5% (Common to A and B)
Linearity	20ns/div. to 0.5s/div. ±3% (×10MAG: ±5%)
Hold off	A sweep is continuously variable from NORM.
Trace separation	B sweep is continuously variable by approx. ±4 divisions with resp. to A sweep.
Delay method	Continuous delay, trigger delay and trigger count
Delay time	Continuous delay and trigger delay: 0.2 to 10 times as large as A SWEEP TIME/DIV. (Full scale at 5000 counts)
Trigger count	1 to 2000 counts, max. operating frequency: 10MHz
Delay accuracy	± (2% of set value+1% of full scale) + (0 to 100ns)
Delay jitter	20000: 1 or less

Triggering	
A trigger modes	AUTO, NORM, SINGLE & FIX
Trigger sources V MODE	Triggered by input signal of lowest-number channel selected for vertical axis mode.
CH1	Triggered by CH1 vertical axis input signal.
CH2	Triggered by CH2 vertical axis input signal.
CH3	Triggered by CH3 vertical axis input signal.
CH4	Triggered by CH4 vertical axis input signal.
LINE	Triggered by commercial supply frequency.
Trigger coupling	AC, HF_{REJ}, DC, TV-P1, TV-P2, TV-LINE
Trigger level	Variable by ±90° with controller.
Polarity	Positive and negative
B trigger source	B starts after delay time B triggered after delay time

SPECIFICATIONS

	Trigger count
Trigger sensitivity	
coupling	Frequency range Minimum sync amplitude
DC	DC to 50MHz 1 div.
	DC to 100MHz 1.5 div.
AC	20Hz to 50MHz 1 div.
	20Hz to 100MHz 1.5 div.
HF_{REJ}	Increased minimum sync amplitude for above 10kHz.
TV F1	1.0 div.
TV F2	1.0 div.
TV LINE	1.0 div.
	AUTO: Same as above specification for above 50Hz.
	FIX : Same as above specification for above 40Hz.
Jitter	0.5ns or less at 100MHz at 2ns/div. sweep rate (×10MAG on)
Intensity modulation	
Input voltage	Disappears at TTL-level positive voltage (2Vp-p or more).
Input impedance	10kΩ or more
Frequency range	DC to 10MHz
⚠Max. input withstand voltage	50V (DC+AC peak)
Others	
Program	Program mode (Storing and executing on-panel set values)
Programming range	Switches and controllers on panel, excluding power switch and CRT-related controls (Except for the HOLD switch)
Number of steps	20 steps×5 (groups)
Step setting	With SET switch on front panel and program step terminals on rear panel
Trace rotation	Trace angle is adjustable with controller.
Calibration voltage	1Vp-p±1% (Positive polarity, 1 kHz±3%, square wave)

【Storage Section】

Vertical axes (CH1, CH2, CH3 & CH4) <For the DCS-9120, storage channels are only CH1 and CH2.>	
Vertical resolution	8bits (25 dots/div.)
Dynamic range	±5 div.
Frequency response DC	Effective storage frequency: DC to 40MHz [16MHz] (Sine interpolation)
AC	Effective storage frequency: 5Hz to 40MHz [16MHz] (Sine interpolation)
Equivalent sampling DC	DC to 100MHz, within -3dB (5mV/div. to 5V/div.)
	DC to 20MHz, within -3dB (1mV/div., 2mV/div.)
AC	5 Hz to 100MHz, within -3dB (5mV/div. to 5V/div.)
	5 Hz to 20MHz, within -3dB (1mV/div., 2mV/div.)
Rise time	Effective rise time: 16ns [40ns] or less (Linear interpolation)

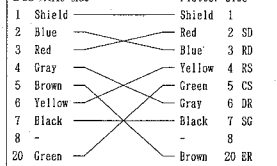
SPECIFICATIONS

Memory capacity (Memory capacity used in each mode)	
NORM sampling	Display memory (for data) 2K words/channel (200 dots/div.) Display memory (for REF) 2K words/channel Acquisition memory 16K words/channel REF memory 16K words/channel
Equivalent sampling	Display memory (for data) 2K words/channel (200 dots/div.) Display memory (for REF) 2K words/channel Acquisition memory 2K words/channel REF memory 2K words/channel
Roll mode	Display memory (for data) 2K words/channel (200 dots/div.) Display memory (for REF) 2K words/channel Acquisition memory 16K words/channel REF memory 16K words/channel
Memory backup	Backed up by battery for approx. 30000 hours (at room temp.) REF memory 16K words/channel
Sweep time and display mode	
NORM sampling	20ns/div. to 500s/div. (Magnification range: 20ns/div. 1ns [2ns]/div.) (Max. sampling speed: 100Ms/s [40Ms/s])
Peak detector	10μs/div to 500s/div
Equivalent sampling	20ns/div to 1μs [2μs]/div
Roll mode	0.2s/div to 500s/div
Storage method	
NORM	Data is updated every time trigger is input.
SINGLE	Saves data after storage.
AVG	Average by adding 2, 4, 8, 16, 32, 64, 128 and 256 times
PEAK	Detects glitch of width up to 50ns.
ROLL	Records and updates data continuously on CRT.
Equivalent sampling	Random
Memory size	2K words/CH, 16K words/CH, 2K words×8/channel
Magnification and contraction	
Magnification	Data is magnified by setting SWEEP TIME/DIV faster than current sweep time in hold state. (Magnified up to ×100 away from the screen center.)
Contraction	Data is contracted by setting SWEEP TIME/DIV slower than current sweep time in hold state. (Contracted down to 1/10. or 8 div on screen, toward the start point on the screen; down to 50 ms in B sweep.)
Interpolation	Linear interpolation, sine interpolation and spline interpolation
Triggering	
Pre-trigger	0 to 80 div. (1-division-step setting, div. display or time display) 0 to 10 div. (when MEMORY SIZE menu is set to 2k)
Post-trigger	0 to 10000 div. (1-division-step setting, div. display or time display)

SPECIFICATIONS

B trigger	B starts after delay time B triggered after delay time Trigger count: 1 to 2000 counts
X-Y	
NORM	DC to 40MHz [16MHz] (Sampling speed is adjustable with SWEEP TIME/DIV.)
Equivalent sampling	DC to 100MHz
Others	
Waveform operation	+, −, ×, ÷ (CH1-CH2 and CH3-CH4 operation)
GO/NO-GO	Judged in cursor-set condition range. (Output terminal on rear panel)
Judgment error	Cursor-set condition range within ±0.5 divisions
AUTO SET	Automatic range setting in accordance with input waveform. (Auto set operation is possible in the real-time mode)
Operation mode	Vertical only, horizontal only, and both vertical and horizontal
Set value	Vertical (peak value): 2 div (1 to 3 div), 4 div (2 to 4 div) Horizontal (cycle) : 2 div (1 to 3 cycles), 4 div (3 to 7 cycles)
Operation range	2mVp-p to 40Vp-p, 50Hz to 5MHz (Range where fix triggering is possible)
PEN OUT (Hard copy of CRT screen)	
Y-axis output voltage	0.5V/div ±5%
X-axis output voltage	0.5V/div ±5%
Pen lift	TTL-level; Low level during pen down motion
Output impedance	X- and Y-axis: Approx. 2kΩ Pen lift : TTL OUT
Readout speed	10ms, 50ms, 100ms & 500ms/word
PLOT OUT (Hard copy of CRT screen)	
Through RS-232C	
Output	Via RS-232C using HP-GL command, data transfer only. RS-232C/GP-IB selection is allowed (with the DIP switches on the rear panel.)
Baud rate	9600/4800/2400/1200 bps
Transmission format	Data length: 7/8 bits, parity setting is possible. stop bits: fixed to 2 bits, hardware hand shake
Signal	FG (Frame Ground) Frame ground SD (Send Data) Send data → Plotter RD (Receive Data) Receive data ← Plotter RS (Request to Send) Request to send → Plotter CS (Clear to Send) Clear to send ← Plotter DR (Data Set Ready) Data set ready ← Plotter (Request to send from plotter) ER (Data Terminal Ready) Data terminal ready → Plotter (Permission to send from plotter) SG (Signal Ground) Signal ground

SPECIFICATIONS

Connection	
Through GP-IB Output	Via GP-IB using HP-GL command (applicable to HP-GL plotter made by EPSON), talk-only. RS-232C/GP-IB selection is allowed (with the DIP switches on the rear panel).

【Readout Section】

Calendar	
Display	Year, month, day, o'clock, & minute
Clock accuracy	±2 minutes/month
Battery life	Approx. 30000 hours (at room temp.)
Trigger time stamp	Displays time when trigger is input in storage mode (single sweep).
Set value	
Vertical axis	CH1 to CH4 scale factors (with probe detection), GND, AC/DC, V-UNCAL, ADD, INVERT, BW
Horizontal axis	(A, B) sweep scale factors (magnification conversion), SWEEP VARIABLE UNCAL, X-Y (Channel selected as trigger source is displayed.)
Trigger	Delay time and trigger count
Storage	Sampling speed in X-Y display mode, waveform operation (+, −, ×, ÷), operation channel specification (CH1 to CH4) <For the DCS-9120, storage channels are only CH1 and CH2>, display scroll, average number setting, trigger point display (pre-trigger, post-trigger), equivalent sampling, roll, REF memory set conditions
Others	Auto step display, trigger time stamp display, SRQ, comment display (for 10 screens), automatic waveform parameter measurement
Automatic waveform parameter measurement	
PERIOD	Automatic measurement of period of trigger source waveform
FREQUENCY	Automatic measurement of frequency of trigger source waveform
PULSE WIDTH	Automatic measurement of pulse width of trigger source waveform (Automatic positive/negative selection)
RISE TIME	Automatic measurement of rise time of trigger source waveform
FALL TIME	Automatic measurement of fall time of trigger source waveform
DELAY TIME	Automatic measurement of time difference between trigger source waveform and waveform in channel specified on menu

SPECIFICATIONS

OVER SHOOT	Over-shoot of trigger source waveform is displayed in percentage based on amplitude
UNDER SHOOT	Under-shoot of trigger source waveform is displayed in percentage based on amplitude
PEAK TO PEAK	Automatic measurement of peak-to-peak voltage of trigger source waveform
VRMS	Automatic measurement of effective voltage of trigger source waveform
TOP LEVEL	Automatic measurement of top level of trigger source waveform
BASE LEVEL	Automatic measurement of base level of trigger source waveform
AMPLITUDE	Automatic measurement of amplitude of trigger source waveform
POWER	Automatic measurement of average power from trigger source voltage waveform and current waveform in channel specified on menu
Cursor measurement	
Cursor modes ΔV1	Voltage measurement between ΔREF and Δcursor using CH1 scale factor
ΔV2	Voltage measurement between ΔREF and Δcursor using CH2 scale factor
ΔV3	Voltage measurement between ΔREF and Δcursor using CH3 scale factor
ΔV4	Voltage measurement between ΔREF and Δcursor using CH4 scale factor
ΔV12	Voltage measurement between ΔREF and Δcursor using CH1 or CH2 scale factor (when ADD key is ON state)
ΔV34	Voltage measurement between ΔREF and Δcursor using CH3 or CH4 scale factor (when ADD key is ON state)
ΔT	Time difference measurement between ΔREF and Δcursor using sweep scale factor
1/ΔT	Frequency measurement between ΔREF and Δcursor using sweep scale factor
RATIO	Voltage ratio and time ratio measurement between ΔREF and Δcursor based on 5 divisions on CRT as 100%
PHASE	Phase difference measurement between ΔREF and Δcursor based on 5 divisions on CRT as 360°
Tracking	Δcursor links with ΔREF cursor operation.
Measurement resolution	10 bits
Measurement error	±3%
Measurement range	
Vertical	±3.6 divisions or more from CRT center
Horizontal	±4.6 divisions or more from CRT center

【Power Supply Section】

Supply voltage	90 to 250VAC (2 ranges), 48 to 440Hz
Power consumption	Max. approx. 130W

【Other Specifications】

Dimensions and weight (Values enclosed in parentheses include protrusions.)	
Width	310mm (350)
Height	150mm (163)
Depth	460mm (515)
Weight	Approx. 9kg

SPECIFICATIONS

Operating temperature and humidity	
Within specification temperature	10 to 35℃
Within specification humidity	85% or less
Operating temp. and humid.	0 to 50℃, 85% or less (No dew condensation)

Accessories	
Probes	PC-31 4 (Compatible with readout function)
Attenuation	1/10
Input impedance	10MΩ±1%, 14pF±10%
Power cord	1
Instruction manual	1 copy
Replacement fuses	2

【Interface】

GP-IB (Compliant with IEEE-488 1978)	
Operation	Waveform input/output, panel data output and control: (TALK/LISTEN) Outputting data on screen to plotter (GP-IB/talk-only/RS-232C selection is allowed.)
Command	69 commands
Data accuracy	
Waveform data	8 bits (Same as storage section.)
Cursor data	10 bits (Same as readout section.)
Analog control data	±0.5 div. (Div. display section) (※ display section not specified)

RS-232C EIA Standard (Plot out only; Refer to the description on plot out.)

■ The specifications are subject to change without notice.

SAFETY

SAFETY

Before connecting the instrument to a power source, carefully read the following information, then verify that the proper power cord is used and the proper line fuse is installed for power source. The specified voltage is shown at the fuse holder of the AC inlet. If the power cord is not applied for specified voltage, there is always a certain amount of danger from electric shock.

Line voltage

This instrument operates using ac-power input voltages that 100/120/220/240 V at frequencies from 50 Hz to 60 Hz.

Power cord

The ground wire of the 3-wire ac power plug places the chassis and housing of the oscilloscope at earth ground. Do not attempt to defeat the ground wire connection or float the oscilloscope; to do so may pose a great safety hazard. The appropriate power cord is supplied by an option that is specified when the instrument is ordered.
The optional power cords are shown as follows in Fig. 1.

Line fuse

The fuse holder is located on the rear panel and contains the line fuse. Verify that the proper fuse is installed by replacing the line fuse.

Plug configuration	Power cord and plug type	Factory installed instrument fuse	Line cord plug fuse	Parts No. for power cord
	North American 120 volt/60 Hz Rated 15 amp (12 amp max; NEC)	5 A, 250 V Slow blow 6×30 mm	None	Cord: E30-1951-05
	Universal Europe 220 volt/50 Hz Rated 16 amp	North Europe 5 A, 250 V Slow blow 6×20 mm Other Eurpe 5 A, 250 V V Slow blow 6×30 mm	None	Cord: E30-1819-15
	U.K. 240 volt/50 Hz Rated 13 amp	5 A, 250 V Slow blow 6×30 mm	0.8 A Type C	–
	Australian 240 volt/50 Hz Rated 10 amp	5 A, 250 V Slow blow 6×30 mm	None	Cord: E30-1953-05
	North American 240 volt/60 Hz Rated 15 amp (12 amp max; NEC)	5 A, 250 V Slow blow 6×30 mm	None	–
	Switzerland 240 volt/50 Hz Rated 10 amp	5 A, 250 V Slow blow 6×30 mm	None	–

Fig. 1 Power Input Voltage Configuration

CIRCUIT DESCRIPTION

Vertical Unit (X73-1900-00)

This unit is composed of 12 circuits described below and has the purpose of providing the Y axis of the oscilloscope.

1. 1st ATT

Each of the attenuators of CH1 to CH4 controls the internal relays according to the signal sent from the panel to switch between 1/1, 1/10, 1/100, 1/1000 and AC/DC/GND.

2. Head Amplifiers

Each of the HEAD amplifiers of CH1 to CH4 is composed of KMC-04. The first stage is terminated with 1 megohm and converts the impedance of the signal from the attenuator. A 4x amplifier is added to the latter stage.

3. 2nd ATT

Each of the 2nd attenuators of CH1 to CH4 operates the two relays (K101 and K102 with CH1) according to the signal sent from the panel to switch between 1/2 and 1/4.

4. MAG Amplifiers

Each of the MAG amplifiers of CH1 to CH4 is composed of a relay (K103 with CH1) and opamp (U102 with CH1) and selects whether 5x magnified amplification is applied or not according to the signal sent from the panel. In case 5x amplification is applied (MAG), the signal from the 2nd attenuator is input to the 5x non-inverting amplifier and output to the amplifier of the next stage.

5. VARI Amplifiers

Each of the VARI amplifiers of CH1 to CH4 incorporates an inversion circuit and variation circuit so that the variation amount can be determined according to the amplitude of the analog signal from the Read-Out Unit. The amplifiers of CH1 and CH3 do not incorporate the inversion function but they are still provided with the inversion circuits to assure circuit stability. Each amplifier converts the single-ended signal from the MAG amplifier into differential signal and applies 4x amplification.

6. POSI Amplifiers

Each of the POSI amplifiers of CH1 to CH4 inputs the position signal from the panel and the signal from the VARI amplifier and outputs a signal to which DC bias is applied according to the position signal amount.

7. V-SINGLE Amplifiers

Each of the SINGLE amplifiers of CH1 to CH4 converts differential signal into single-ended signal. As this makes the signal possible to be input to the A/D converter, it is output from the V Unit towards the A/D Unit.

8. Channel Switch

Three channel switching amplifiers are provided for the vertical circuitry and three for the horizontal circuitry. Each of the amplifiers inputs two difference signals and output either or the sum of them for use in V-MODE setting and TRIG-SOURCE setting. The channel switches in the vertical circuitry include U501 for switching between CH1 and CH2, U502 for switching between CH3 and CH4 and U503 for switching between the U501 output and U502 output, and they are controlled according to the signal from the panel. The channel switches in the horizontal circuitry include U601 for switching between CH1 and CH2, U602 for switching between CH3 and CH4 and U603 for switching between the U601 output and U602 output, and they are also controlled according to the signal from the panel.

9. Delay Line Drivers

The differential signal output from the channel switch U503 is input to the emitter-followers of Q501 and Q502, the outputs of which have some frequency response correcting resistors and capacitors attached to them. Transistors Q503, Q504 and Q505 form the circuit which varies the vertical signal positioning amount according to the voltage from the Horizontal Unit that indicates the trance separation shifting amount. Q503 is the current source which supplies the collector current to Q504 and Q505. The trace separation amount is input to the base of Q505 to control the currents of the collectors of Q504 and Q505. This changes the base voltages input to Q508 and Q507 therefore the position is varied. Q506 and Q507 are emitted-grounded differential amplifiers and the delay line is driven by the outputs of these transistors. Q508 and Q509 are used as band-wise switches.

10. Decoder

The decoder is composed of U506, U507, U508, Q510, Q511, Q512, Q513, Q514 and Q515, and is used to generate the control signal to be input to the channel switches of the vertical circuitry for use as their control signal. The signals input to the decoder circuit are the serial data from the Read-Out Unit and the signal switching timing (VCK) signal from the Horizontal Unit. The decoder circuit makes it possible to output traces of multiple phenomena simultaneously on the oscilloscope's CRT or to output the CH1+CH2 and CH3+CH4 waveforms.

11. Latch

The latch circuit is composed of U1, U2, U3, U4, U5, U6 and U7, and is used to convert the serial data from the Read-Out Unit into parallel data and latch it. This makes it possible to control the switching signal of the Vertical Unit using two clock signal lines and one data line.

12. H-SINGLE Amplifier

The H-single amplifier is composed of U604, U605, Q601 and Q602, an is used to adjust the X signal. The X-GAIN is adjusted by applying the analog signal from the Read-Out Unit to pin 5 of U605 and supplying its output to the analog switch of Q601 and Q602. The X-OFFSET is adjusted by applying the analog signal from the Read-Out Unit to pin 2 of U605 and supplying its output to the offset adjustment terminal of U604. The input to this circuit is a differential signal, which is converted into a single-ended signal before being output.

Horizontal Unit (X74-1530-00)

This unit has the purpose of providing the X axis and Z axis of the oscilloscope.

The trigger signal from the V Unit is input to this unit through Q1 and Q2.

The signal is amplified by the trigger amp and converted from analog to digital. The waveform is rectified by U11 and the sweep gate is generated by U34.

When TV signal is input, it is not sent through the trigger amp but sent to the special video amp (U5, U6) for amplification then to

CIRCUIT DESCRIPTION

U7 for sync separation. The sync signal is input to U34 for generating the sweep gate. This circuit is designed so that, when the sweep gate is turned ON, the sawtooth wave from U18 is output and, when the sawtooth signal attains a certain level, the sweep gate is turned OFF by Q15, Q16 and U21.
The delayed sweep signal which uses U18 as the main sweep signal is output from U19.
The respective blanking signals are input from U13 to U14, mixed with the blanking signal of the storage mode, and the obtained signal is output from Q49 as the unblanking signal to be sent to the High Voltage Unit (X68-1590-00).
Transistors Q26 to Q32 are used to select one of the main sweep signal, delayed sweep signal and the X signal of the X-Y mode. The selected signal is input to U24, mixed with the POSI signal to become differential signals X+ and X-, which are input to the H final amp via P16.
With the random sampling, the time-domain information of the data at the moment it is sampled with random sampling is obtained by sampling-and-holding of sawtooth wave by Q35 to Q38 and U26.

Final Unit (X80-1140-00)

This unit has the purpose of amplifying the signals from the V and H Units until the levels high enough to drive the CRT.
From the V Unit (X73-1900-00), the V signal is input to Q1 and Q2 via the delay line. At U1, the V signal is mixed with the Y signal of R/O. The mixed signal is amplified by Q9 to Q14 and supplied to the CRT.
From the H Unit (X74-1530), the H signal is input to Q101 and Q102. At U2, the H signal is mixed with the X signal of R/O. The mixed signal is amplified by Q107 to Q118 and supplied to the CRT.

A/D Unit (X78-1070-00)

This unit has the purpose of sampling analog signals and writing the obtained data in memory.
After A/D conversion by U102 and U202, the level of the signal is converted from ECL to TTL, by U103 and U104 in case of CH1/3 signal or by U203 and U204 in case of CH2/4 signal. The signal is input to U105 (CH1/3) or U205 (CH2/4) for peak detection and the distribution to the 4 memory phase inside it, and recorded in the memory of U106, U107, U108 and U109 (CH1/3) or U206, U207, U208 and U209 (CH2/4). The recorded data is read out by the ADO1 to ADO4 signals and output to the Storage Unit (X77-1660-00) through the data bus connected to the connectors of P56 and P57 (D0 to D7 with CH1/3, D8 to D15 with CH2/4).
The memory write operation is performed at the positive-going timing of LAT4 (pin 10 of P30) when ADRW (pin 15 of P30) is "L", ADRW (pin 16 of P30) is "H" and MEMWE (pin 20 of P56) is "L".
For the memory read operation, while ADRW is "H", ADRW is "L" and DMA1,2 (with CH1/2) or DMA3,4 (with CH3/4) is "L", the data in U106 or U206 is read when ADO1 goes "L", data in U107 or U207 is read when ADO2 goes "L", data in U108 or U208 is read when ADO3 goes "L" and data in U109 or U209 is read when ADO4 goes "L".
Clocks with inverted phase are input to pins 20 and 21 of A/D converters U102 and U202. The A/D conversions are performed at their timings and digital data are output from U102 and U202.
U1 is the clock receiver which receives clock from the Time Base Unit (X71-1150-00) and generates the clocks input to the A/D converter.
Gate arrays U105 and U205 have the internal configuration as shown in Fig. 2. The timing of LAT1, LAT2, LAT3 and LAT4 is as shown in Fig. 3 so data is recorded in the order of from memory U106 (U206), U107 (U207), U108 (U208) and U109 (U209). The clocks of ADO1, ADO2, ADO3 and ADO4 are as shown in Fig. 4, and they are read out in the same order as they are written.
The peak value is detected with the configuration shown in Fig. 1. The data is latched (latch 1) based on the PCLK (pin 2 of P30) with the same frequency as the data output from the A/D converter and compared with the MIN value data which has been latched by latch 2 in comparator 1. As a result, in case the data in latch 2 is smaller than the data in latch 1, comparator 1 outputs the clock and the data in latch 1 is latched by latch 2. As a result, latch 2 stores the MIN value data in it. In the same manner as above, the MAX value data is stored by latch 3 and comparator 2. The data are transferred to latch 4 and latch 5 based on the PWCK with the same frequency as SWEEP TIME, and the data is recalled from selector 1 according to the three modes of MIN, MAX and MIN/MAX alternate detection.

CIRCUIT DESCRIPTION

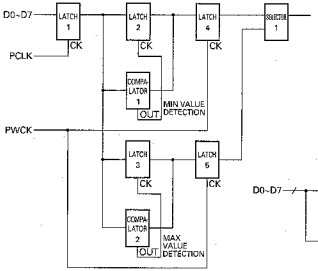


Fig. 1 Block Diagram of Peak Detector Circuit in Gate Array

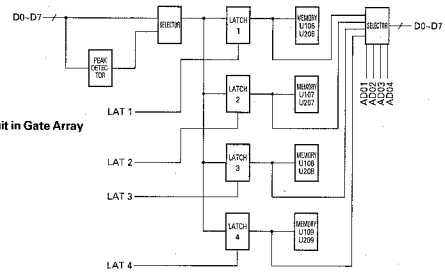


Fig. 2 Internal Block Diagram of Gate Array

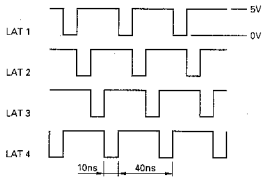


Fig. 3 Clocks LAT1, LAT2, LAT3 and LAT4 When the SWEEP TIME is 2 μs/div. or more

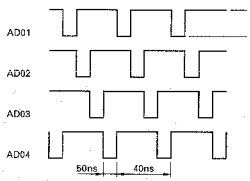


Fig. 4 Clocks ADO1, ADO2, ADO3, ADO4

CIRCUIT DESCRIPTION

Time Base Unit (X71-1150-00)

This unit is composed of 18 circuits described below and has the purpose of generating the timing of the A/D converter.

(1) 200 MHz oscillator

The oscillation by X'tal X1 is amplified by Q6. The oscillation condition is set by trimmer TC2. After impedance conversion by the emitter-follower of Q3, the oscillation signal is input to pin 11 of U3d and set to the ECL level.

(2) CLK divider circuit

The 200 MHz clock is divided by U1b to 1/2, or 100 MHz. Also, a 1/5 divider circuit is formed by U1a, U2 and U3a to divide 200 MHz into 40 MHz. This 40 MHz is input to U56a for level conversion from ECL to TTL and input to U4, where it is divided into 20 MHz and 10 MHz. The 20 MHz clock is then input to U5a, where 2 MHz and 1 MHz are generated from 4 MHz using U6a. The 2 MHz is divided by U5b into 400 kHz. The 400 kHz is further divided into 200 kHz and 100 kHz by U6b and into 400 kHz down to 0.4 Hz by U7 and U8. The dividing ratio of U7 and U8 is determined by the codes (TBCD0 to TBCD4) sent from the U15 according to the sweep time setting.

(3) CLK selector circuit

The clock signals generated by the CLK divider circuit are selected by U9. The selection is made according to the sweep time setting. The sweep time codes (TBCD5 to TBCD7) are sent from U15 to U9 and the corresponding clock is output at pin 6 of U9.

(4) PEAK DET controller circuit

U11, U52b, U10abd and U61d are in charge of control at the time of peak detection. U52b, U10abc and U61d are used to take the timing with G/A in the A/D Unit. U11 is used to select between the AD clock and LATCH clock. U11 is controlled by U17 and pin 2 outputs the AD clock and pin 15 outputs the LATCH clock. At the time of peak detection, 40 MHz is output as the AD clock.

(5) AD CLK adjustment circuit

DL1 and P1 form the circuit for taking the timing between the A/D data and LATCH clock. With this circuit, the position of P1 is adjusted while monitoring the test pins (J2, J3) of the A/D Unit so that the LATCH clock comes on the center of the A/D data.

(6) AD CLK buffer

U16abc send the clock signal from the AD CLK adjustment circuit to the A/D Unit together with a clock with inverted phase. These signals are used as the clock signals (ADCK12, ADCK34) of the AD converter.

(7) LATCH CLK circuit

The LATCH clock output from U11 is converted by U12 and U13 into 4-phase LATCH clock signals, which are output as LAT1 to LAT4. These signals are sent to the A/D Unit for use as the LATCH clocks inside the G/A. Two of these signals (LAT1, LAT3) are also used for various control operations inside the Time Base Unit. The LATCH CLK circuit is controlled by the SGA controller circuit which is described below. However, in the roll mode and during pre-triggering, it outputs 4-phase clock signals regardless of the SGA controller.

(8) SGA controller circuit

This circuit is composed of U14, U48, U3bc, U49d, U50c and Q1, and is used to start the LATCH CLK circuit in synchronism with the SGA signal. This circuit operates so that SGA can be accepted when ADR_/W is "H", and the LATCH CLK circuit is activated when Q_ of U14b goes "H". However, this circuit does not function in roll mode and during pre-triggering.

(9) Memory Write CLK controller circuit

This circuit is composed of U42, U43a, U44bc and U46d, and is used to generate the Write Enable signal of the ACQ memory (A/D Unit) and the clock for the address counter of the memory from LAT1 and LAT3 sent from the LATCH CLK circuit. The ACQ memory (A/D Unit) Write Enable signal is output from Q of U42a as MEM WE_. This signal is used by the EQU sampling control circuit and by the ADR/W_ generator, which is used during rolling, in the pre/post delay counter circuit. These circuits will be described later. The clock signal for the memory address counter is output from pin 11 of U46d.

(10) Fast memory counter circuit

The counter formed by U18, U19 and U20 sets the address of the ACQ memory (A/D Unit) and is used both in write and read. The write clock is sent from the memory Write CLK controller circuit (pin 11 of U46d) which is described above, and the read clock is sent from the DMA controller circuit (pin 3, U46e). The write end signals for memory sizes of 2K and 16K are generated from this counter except during pre-triggering and in the roll mode. The signal from pin 11 of U51d indicates the end of write of 2K memory and the signal from Q_ of U43b indicates the end of write of 16K memory. The signal is sent to the R/W controller circuit and write ends when ADR/W_ goes "H". The end of write during pre-triggering occurs when pin 7 of U33 in the pre/post delay counter circuit goes "H", and the end of write in the roll mode occurs when Q(MEMWE_) of U42a is input to pin 3 of U52a, Q_ goes "L" and ADR/W_ goes "H".

(11) R/W controller circuit

This circuit is composed of U40, U45cd, U49a, U50ab, U51a and U52a, and is used to inform the Storage CPU of the ACQ memory data transfer by turning the ADR/W_ signal "H" when the memory count (16K, 2K, or 4 words in roll mode) set for the ACQ memory (A/D Unit) has been written. Upon receipt of this signal, the Storage CPU sends the AEN and DMAAK signals to the DMA controller and the data is transferred. When the data transfer completes, the Storage CPU sends DLYCNTLD_, which resets the R/W controller circuit and turns ADR/W_ "L", starting the stand-by for next data write (SGA stand-by). ADR/W_ is "L" during write or write stand-by of ACQ memory and "H" during DMA transfer and serial transfer (mode change), and it is used as the base of the operation of the Time Base Unit. In case of mode change, ALL RESET occurs, turning ADDCNTLD_ "L" and resetting all circuits to the initial status.

(12) DMA controller circuit

This circuit is composed of U37, U38, U39, U45b, U46a, U47ab and U49bc. When ADR/W_ goes "H", the Storage CPU sends AEN, DMAAK_ and DMARST_ to the DMA controller so the waveform data in the ACQ memory is sent to the data memory of the Storage CPU through DMA transfer. At this time, DMAAK is divided into 1/4 by U37 and sent to the fast memory counter

CIRCUIT DESCRIPTION

for use as the DMA read clock. AEN and DMAAK_ are processed by U38 and U39 to generate 4-phase memory select signals (ADO1, 2, 3 and 4), which are sent to the G/A of the A/D Unit. DMARST_ is output at the completion of DMA transfer of CH1 and CH2 or CH3 and CH4 and resets the DMA controller circuit. At the time of read-out, the start address in the ACQ memory is set by HC595 of U23 and U24.

(13) SGA enable counter circuit

This circuit is composed of U25, U26, U27, U41 and U44d, and functions only during pre-triggering. This counter circuit inhibits the acceptance of SGA until the ACQ memory has been written until the set pre-triggering value. The counter setting is specified by software and set in PRED0 to PRED11 in U28 and U36. The value set for the counter is [Pre-triggering setting value (div.) * 50]. The operation of the counter starts at the same time as the write in the ACQ memory. When the count attains the set count value, Q_of U41a goes "H", the RESET terminal (pin 1) of U41b goes "H" at the same time, and acceptance of SGA is enabled by CK of U41b (pin 11). When SGA is accepted, Q_of U41b goes "L", pin 4 (CE terminal) of U29 also goes "L" and the operation of the pre/post delay counter circuit is enabled.

(14) Pre/post delay counter circuit

This circuit is composed of U29, U30, U31, U32 and U33, and functions during pre-triggering or post-triggering. During pre-triggering, the value set for this counter differs depending on whether the memory size is 2K or 16K. The value set in the 2K mode is [511 -N(div.) * 50] while the value set in the 16K mode is [4095 - N(div.) * 50]. During pre-triggering, the value set for the counter is decremented down as SGA is input and, when it is counted down to "0", ADR/W_ goes "H" and the write in the ACQ memory ends. During post-triggering, the value set for the counter is [N(div.) * 50] regardless of the memory size. Similarly to the case of pre-triggering, the counter is decremented as SGA is input but, in this case, write in the ACQ memory starts when the counter is counted down to "0". "N" in the expressions above can be set up to 80 div with pre-triggering and up to 10,000 div. with post triggering. The counter is set by DLYD0 to DLYD19 of U34, U35 and U36.

(15) Pre-triggering address buffer

This buffer is composed of the line driver of U21 and U22, and is used during pre-triggering. Because the trigger point start address is not specified in the ACQ memory in pre-triggering, the trigger point address is calculated from the end address in the ACQ memory (the address where write was ended) using the set value. The end address can be read as follows; when ADR/W_ goes "H" to request the Storage CPU to transfer the waveform data in the ACQ memory, the Storage CPU sends the LADR signal so the end address is output to the CPU bus.

(16) Equivalent sampling controller circuit

This circuit is composed of U58d, U59 and U60d, and functions during equivalent sampling. This model is based on random sampling and this circuit generates the hold clock (EQA2) for the random sampling. This clock is generated by dividing MEMWE_ of the memory write CLK controller circuit described above, using U59. U60 is used to take the timing of equivalent sampling during pre-triggering. The generated EQA2 signal is sent to the Horizontal Unit for use in sample & hold of sawtooth wave.

(17) WRITE LED controller circuit

This circuit is composed of U47f, U58ac, U51c, U60a and Q7. This circuit is used to light the WRITE LED on the panel and the signal is sent to the Panel Unit as the WRITE signal. This circuit operates as follows; when SGA is input while the ADR/W_ signal is "L", Q_of U60a goes "L" and pin 3 of U58a goes "L" and Q7 is turned ON, lighting the WRITE LED. If the sweep time was set faster, this interval would become short and the WRITE LED lights hardly. To prevent this, the one-shot circuit of U60a works to turn Q7, that is, the WRITE LED lights for a certain period of time.

(18) AD REF power (-2 V)

This is the reference voltage generator circuit of AD converter CX1396D and composed of opamp U53a and transistor Q2. The power is supplied to pin 23 of the AD converter in the A/D Unit and determines the dynamic range of the AD converter. The reference voltage is -2 V.

Storage CPU Unit (X77-1660-0X)

This unit has the purpose of providing the waveforms required by the operating by calculating the stored waveform data.

The CPU (U1) is uPD70335GJ-8 (hereinafter V35+). The clock of the CPU is supplied from 16 MHz in X1 and the internal operation uses 8 MHz. The CPU has a 16-bit bus configuration. At the time power is turned ON, the CPU is reset by MB3771 of U44.

The system ROM is composed of U6 and U7, with U6 used for even channels and U7 for odd channels. It is a 64K byte memory. The system RAM is an 8K byte memory composed of U8 and U9.

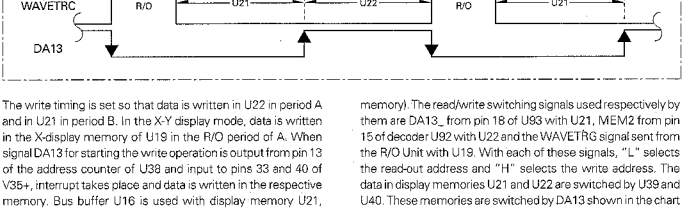
U10 to U15 are used as the data memory and each memory chip has a capacity of 32K bytes. U10 and U11 are used for reference memory, U12 and U13 are used for computation memory and U14 and U15 are used for data memory. The reference memory is backed up even when the power is OFF by battery B1. The back-up circuit is composed of U20, D2 and D3. U94 checks the battery when the power is turned ON and, if the battery voltage is below about 2.4 V, pin 45 of V35+ goes "H" and the BATT DOWN indication appears.

The data sent from the ACQ memory by DMA transfer is written in the data memory of U14 an U15. The written data is processed by the computation memory of U12 and U13 in case computation or averaging is selected with the menu. The DMA transfer starts when ADR/W_ sent from the TBC Unit goes "H". To start the DMA transfer, pin 19 of the same output port outputs the DMAON signal to turn Q (pin 5) of the flip-flop of U88 "H" and this signal is input to pin 17 of the CPU (V35+) to set the DMA status. The signal is input to pin 19 of the CPU bus buffer of U2 and U3 to cut the data bus between the CPU.

The AEN signal, which is the DMA Transfer Enable signal, is output from pin 12 of U53 of the output port, and DMAAK (acknowledge signal) which is the transfer clock is output from pin 6 of U79. This signal is generated in U79 with R/W_ (pin 59), DMAAKO_ and MREQ_ which are output from V35+. DMARST_

CIRCUIT DESCRIPTION

which is the DMA transfer refresh and reset signal, is output from pin 2 of U52 of the output port. The DMA transfer occurs simultaneously on 2 channels. First, CH1 or CH2 is selected by DMA12_ output from pin 11 of U80, then CH3 or CH4 is selected by DMA34_ output from pin 8 of U80, and DMA transfer is started. The transfer data for odd channels is output at D0 to D7 and that for even channels is output at D8 to D15.
The data transferred from the ACQ memory to the data memory is sent to the display memory after having been processed. The display memory is provided by U21 and U22, each of which is an 8K byte memory. U21 stores the data and reference memory contents for CH1 and CH3 and U22 stores the data and reference memory contents of CH2 and CH4. These memories are read by 2K words per channel and 1 MHz per data so, everything can be read in a period of about 20 ms including the R/O period. The read-out timing is as shown below.



The write timing is set so that data is written in U22 in period A and in U21 in period B. In the X-Y display mode, data is written in the X-display memory of U19 in the R/O period of A. When signal DA13 for starting the write operation is output from pin 13 of the address counter of U38 and input to pins 33 and 40 of V35+, interrupt takes place and data is written in the respective memory. Bus buffer U16 is used with display memory U21, buffer U17 with display memory U22 and buffer U18 with the X-display memory. When writing in the display memory, the buffer to be used is selected using MEM1G of U91, MEM2G of U92 or MEM3G of U93 in the decoder circuit and R/W_ output from the CPU.
U37 and U38 are the address counter for the display memories. The clock for this counter is counted by 2 MHz sent from the TBC Unit. The display memory address counter formed by U37 and U38 is activated by the WAVETRG signal from the R/O Unit (refer to the read-out timing chart above). The WAVETRG signal is connected to pins 2 and 12 (CL terminals) of U37 an U38 and "H" state of this signal indicates the R/O period in which the counter is cleared (address 0). When the WAVETRG signal goes "L", the counter is activated based on the 2 MHz CLK connected to pin 1 of U37. The read-out address output from this counter is sent to the read/write switching circuit. This switching circuit is composed of U23 to U33, where U23 to U26 are used for switching the U21 (display memory for CH1 and CH3), U27 to U30 are used for switching the U22 (display memory for CH2 and CH3) and U31 to U33 are used for switching U19 (X-display memory). The read/write switching signals used respectively by them are DA13_ from pin 18 of U93 with U21, MEM2 from pin 15 of decoder U92 with U22 and the WAVETRG signal sent from the R/O Unit with U19. With each of these signals, "L" selects the read-out address and "H" selects the write address. The data in display memories U21 and U22 are switched by U39 and U40. These memories are switched by DA13 shown in the chart above; the display memory U21 is selected when DA13 is "L" and the display memory U22 when it it "H", and the selected data is sent to the display memory latch (latch for STO-Y). When the memories of all channels have been read out, DA14 of the display counter causes pin 9 of U81 to output the MOJITRG signal; when this signal is sent to the R/O Unit, the R/O CPU outputs characters.
The circuit for selecting the output ports, communications read signal (ROIN), display memories, etc., is the decoder circuit, which is composed of U50, U74, U78, U79, U80, U82, U83, U84, U86, U90, U91 and U92. U90, U91 and U92 are programmable ICs (GAL). (For the decoder, read the description on the separate sheets.)
The data output from the display memories are selected by U39 and U40, input to the display data latch of U57 and latched by the signal which is generated by U89 using the clock (2 MHz) for the read address counter (pin 9). At this time, the address of the read-out address counter is input to the latch for STO-X of U59 and U61 and latched in the same manner as above. The data of the X-display memory is also latched by the latch for X-Y of U60.

CIRCUIT DESCRIPTION

The data latched by U57 is input to the D/A converter for STO-Y of U68, then the analog data from U68 is input to pin 5 of U72 and output from pin 7 of U72 (opamp) as STO-Y. The data latched by U59 and U61 are input to D/A converter for STO-X of U69. However, in case the display mode is X-Y, pin 6 of U64 goes "L" so the data to be input to U69 are switched over to the data latched in U60. The analog data output from U69 is input to pin 3 of U72 and output from pin 1 of U72 as STO-X. The order of data output channels are as shown in the figure below, and the corresponding blanking is provided by the blanking circuit composed of U93, U43, U41 and U42. (Refer to the diagram below as well as Fig. 5.)

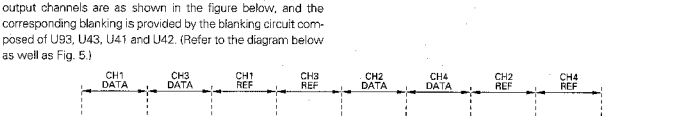


Fig. 5

The blanking circuit provides two kinds of blanking operations, the channel blanking applied when a channel is selected and the GRG blanking applied after reading every single data.
For the channel blanking operation, the CPU sets the condition in the latch of U42 according to the V-MODE setting on the panel and the REF memory setting. The set condition is input to U41 and, using the data set with the display counter signals of DA11 and DA12 input to pins 2 and 14 of U41 as the storage display gate, output from U41 as STB13 (pin 7) for CH1 and CH3 and as STB24 (pin 9) for CH2 and CH4. The Enable signals for CH1/3 and CH2/4 are based on signals DA13 and DA13_ which are input to pins 1 and 15 of U41. These signals are input to U93 (GAL), processed logically with signals such as WAVETRG, DA11 and DA12, and output as STBDAT (pin 13) and STBREF (pin 14). Position select signals DA112 and DA121, which are synchronized with the signals above, are output from pins 16 and 17 of U93 and input respectively to pins 10 and 9 of U66 and U67. At U66, the V position is selected from the V position signals CH1 to CH4, which are input to pins 12, 15, 14 and 11 based on DA13 and DA112 and output the V-POSI voltage of the selected channel from pin 13 of U66. The output voltage is input to pin 12 of U65, where it is switched between the data memory position and reference memory position based on DA12 and DA121. The reference position voltage uses the trace separation potentiometer, and the voltage is input to pin 13 of U65 as TSEPA. After the position has been selected, the voltage is output from pin 13 as the YOFT signal, input to the amp for STO-Y (pin 6 of U72) and offset is applied there.
When the display channel is switched over, pin 13 of U43 outputs STOBLK to apply blanking for channel switching.
For the GRG blanking, pin 5 of U43 outputs the GRGBLK signal so that blanking is applied after having read every single data. This signal is output in synchronism with the read clock.
The compression blanking is possible when the memory mode is 16K HOLD. When the compression is 1/10, the length of the trace on the CRT becomes 8 div. so a blanking is applied for the remaining 2 div. The compression blanking circuit is composed of U75, U81, U83 and U85. When the condition as described above occurs, the CMPBLK signal output from pin 12 of U54 of the output port goes "H" to activate the compression blanking circuit. In this operation, when the display counter has counted 1683 counts, pin 5 of U85 goes "H", this signal is input to pin 5 of U93 as the DFF signal and causes blanking.
The analog pen output circuit is composed of U86, latches U62, U63 and U64, D/A converters U70 and U71 and opamp U73. All of the data sets are software-controlled, and data is sent to the latches according to the data read-out rate set by the menu. U62 latches the STO-Y data and U63 and U64 latch the STO-X data. The latched data are sent to the D/A converters, the signal output from U70 (pin 18) is input to pin 3 of U73 and output from its pin 1 as the STPY signal. The signal output from U71 (pin 18) is input to pin 5 of U73 and output from its pin 7 as the STPX signal.

The communications with the R/O Unit occurs when a panel setting is changed, etc. The communications are serial in both directions and the date length is 16 bits. When a command is communicated from the R/O Unit to the Storage CPU, 16 data are transferred to U55 and U56 by ZD (Data) and ZSC (Shift Clock). When these 16 data have been prepared in U55 and U56, ZLC (Latch Clock) comes, making the Storage CPU possible to transmit data towards the data bus. This signal is also input to CK (pin 11) of U85 (F-F), turning Q_ (pin 8) of U85 "L", which is input to NMI (pin 30) of the CPU to cause priority interrupt processing. At the same time, U85 (pin 9) sends the StorageRDY signal to R/O Unit to inform it that the NMI processing is taking place. When the NMI processing starts, the CPU first reads the data prepared in U55 and U56. The data is read by turning OE (pin 13) of U55 and U56 "L" using ROIN_ of U50 (pin 10) of the decoder

circuit. When the data has been read, the port of pin 27 of V35+ outputs the NMI end signal. When this signal is input to pin 13 of U85 and this flip-flop is reset, the NMI processing completes and the stand-by for the next communication starts.
Inversely, in case of command communication from the Storage CPU to the R/O Unit, serial transfer from output ports YD, YSC and YLC (pins 9, 6 and 5) of U54 to the R/O Unit occurs. YD transfers the data, YSC transfers the shift CLK and YLC transfers the latch CLK in the same way as above.

The output ports mentioned above are composed with U52, U53 and U54. ADDCNTLD_ and DLYCNTLD_ which are sent to the TBC Unit are also output from the output ports of U53. The data of these output ports are latched by decoder U50.

Additionally, there are GP-IB I/O ports of U51. These ports are used to exchange data with GP-IB IC uPD7210 in the GP-IB Unit (X79-1120-00) and read the status of the DIP SW on the rear panel. The DIP SW status is sent to A1 to A8 of U51 when GPSW_ at pin 12 of U52 goes "L". This signal is also sent through U83 and input to pin 19 of U51 to enable it. Then, the GDIR signal at pin 1 of U91 goes "H" to make this IC input ports and the data is read. To exchange data with uPD7210, the GPWS_ and GPRD_ signals output from U91 writes data in or read it from uPD7210, and the GDIR signal mentioned above is switched in synchronism with these signals. The Enable signal for this operation is GPSEL_ at pin 13 of U51. According to it, the GDIR signal at pin 1 is set to "H" when the IC is input ports and "L" when it is output ports. The set also has the RS-232C interface, which is controlled by signals from V35+. The control signals are RTS0 at pin 66 of V35+, RXD0 at its pin 10, CTS0_ at its pin 12 and TXD0 at its pin 13.

R/O Unit (X77-1670-0X)

The R/O Unit uses 8-bit general-purpose CPU Z80B to control the horizontal, vertical, storage and panel operations and output characters on the CRT. The R/O Unit can be divided roughly into the analog voltage controller block, input/output port block, switch input block, encoder input block, clock block, TV counter block and the CRT controller block.
There are four kinds of clocks used as the basis of IC operation timings, that are the main clock, R/O clock, AH clock and jitter clock.
The main clock is generated by the oscillator composed of an inverter (U96) and 6M ceralock (X1) and supplied to the CPU (Z80B) of U1.
The R/O clock is generated by the oscillator composed of an inverter (U96) and 4M ceralock (X2), used as the CRT display master clock and used to generate the ROREQ, ROUBL, ROBLK and DOT count signals.
The AH clock is generated by U28 and used as the free-running clock for analog hold operation.
The jitter clock is generated by U26 and used to vary the character interrupt period during realtime sweeping.

All of the information changes from switches and encoders, that are necessary for the CRT display information, and communications with the clock and Storage Unit are transmitted to the CPU by means of interrupt.

When a panel SW is pressed, one of D0 to D7 of U77 which are connected as the data bus for switch data goes "L" and pin 9 of U80 outputs the triggering pulse to activate the timer of U28. In about 2 ms when the influence of key chattering has disappeared, pin 2 of U75 goes "L" at the same time as the negative going of the time output, informing the CPU of the change in the SW status. When the CPU is interrupted, it selects the line with serial transfer using U61 (SSC, SLC) and U62 (SD), reads column data from U55 and determines the condition of the SW matrix.

The rotary encoder, which is used for switching between volts/div and sweep time, has two outputs (phase A, phase B). The timing of phases A and B is as shown in Fig. 6.

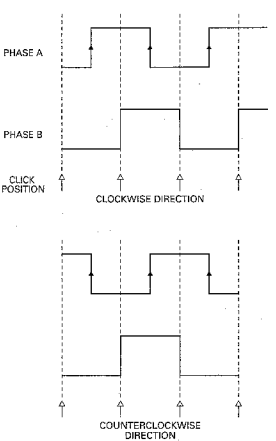


Fig. 6

CIRCUIT DESCRIPTION

For example, when CH 1 volts/div rotary encoder is used, the outputs of phases A and B are input to the Schmitt circuit of U67 to remove chattering and shape the waveform. When phase A changes, pin 6 of U68 outputs a triggering pulse to turn pin 6 of U73 "L" and thereby inform the CPU of the change in the rotary encoder. The CPU determines the rotation direction from the output from pin 3 of U68. If the direction is clockwise, the output is "H" at the moment it is interrupted. If it is counterclockwise, the output is "L" at the moment it is interrupted.

Even when the power is OFF, U7 is backed up by lithium battery B1 and the 32.768 KHz basic clock generated by X'tal oscillator X3 is also operated. When the power is turned ON, IRQ goes "L" at a certain interval and interrupts the CPU to inform it of the change in time. The CPU updates the calendar on the CRT screen according to it.

The communication from the Storage Unit is handled by U64 and U65 and data is sent 16 bits by 16 bits.
When the latch signal from the Storage Unit is input, Q of U76 goes "L" and the CPU is interrupted.

The analog voltage block can be divided into input section and output section.
The voltages input through VRs are 1VAR to 4VAR, 1POSI to 4POSI (A/B), ^REF (A/B), TRIG LEVEL, EQVREF, SWEEP VAR, T-SEP, H-POS and H-FINE. These VR voltages are connected to U20, U21 and U22, selected by U38 and U39, compared in U25 with the D/A output voltages from U10, U59 and U60, and quantized. D/A converter U10 and comparator U25 form a simulated approximating A/D converter circuit, which converts the VR voltages into 12-bit data. The 12-bit data after conversion are computed and written in their respective addresses in RAM U6. To write data U41 to U43 connect the bus of U6 with the CPU.
The signals for latching the address setting and output data of the analog hold data RAM (U6) and for selecting the output analog switches are generated by the about 25 kHz clock of U28 and counter U50. The data of the specified address is latched as 12-bit data, the lower 8 bits by U44 and the higher 4 bits by U45, and output to D/A converter U11 for D/A conversion. U16 to U19 are analog switches, and the D/A converter signal is output from the IC pin selected by AC1 to AC5. The output has 32 channels, the voltage of each of these channels is held by an opamp and CR and output through a resistor.

U51, U52, U53, U54, U55, U64 and U65 are the input ports. The signals are decoded by U9 and U57 and output from the IC to the data bus. U51 is used to determine the rotation direction at the time of encoder interrupt and is "H" with clockwise rotation.
Bits 0 to 3 of U52 are used for probe detection, with "L" indicating a 1:10 probe. Bit 4 of U52 goes "H" when the data sent to the Storage Unit has not been received.
U53 is used to determine the cause of interrupt.
Bit 0 of U54 is used for footswitch detection. It goes "H" when the footswitch is pressed ON and, even after the footswitch is switched OFF, monostable multivibrator U88 holds the "H" status for more about 20 ms. Bit 1 is used for automatic detection of TV signal and goes "H" when PAL signal is input during TV triggering. Bit 2 is the voltage comparator output and connected to pin 7 of U26. Bit 3 goes "H" when the single sweep is ready. Bit 4 goes "H" when write in analog hold RAM (U6) is inhibited. Bit 5 is also used for automatic detection of TV signal and goes "L" when interlaced signal is input during TV triggering. Bit 6 is the battery monitor terminal going "H" in case of abnormal voltage. Bit 7 goes "H" when the communication is inhibited for the Storage Unit.
U55 reads the column data of the SW.
U64 and U65 converts serial data communicated from the Storage Unit into 16-bit parallel data.

U39, U59, U60, U61, U62 and U63 are the output ports. U39 selects the analog voltage input, U59 and U60 latch the data of the D/A converter (U10), U61 and U62 generates the data, shift clock and latch clock for the serial transfers of the Vertical, Horizontal, Switch, LED and Storage Units, and U62 also generates the buzzer output signal. Bit 0 of U63 causes character interrupt, in realtime with "H" and from storage with "L". Bit 1 clears the waveform display when it goes "L" and bit 2 clears the realtime waveforms by forcing ROBLK to "L". Bits 3 and 4 select the bank of the backup ROM (U4), and bit 5 selects the bank of the program ROM.

U9, U38, U40, U56, U57, U58 and U79 form the decoder circuit and U9 uses PAL. The PAL is provided with a circuit configuration which allows it to decode the input ports, output ports, clock, ROM, RAM and dual-port RAM. U56, U57 an U58 are selected by U9 and generates the decoder output according to the address.

The TV counter is composed of U8 and U66, and is used to count the line in TV operation, select the TV signal and select the buzzer frequency.

U4 is an SRAM. Its capacity of 32K bytes is divided into 4 banks to use 1 bank for storage of system data and 3 banks for storage of program step data. The SRAM is backed up by battery B1 even while the power is OFF; when power is turned OFF, U23 switches it to the back-up mode.

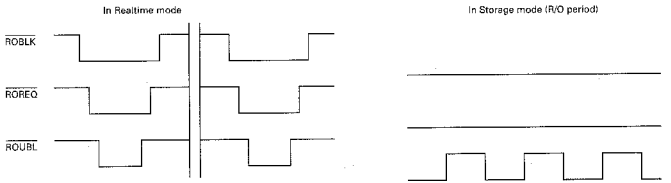
U2 is the program ROM with a capacity of 64K bytes. It is used by dividing the capacity into 32K x 2.

U5 is the dual-port RAM for CRT display. It is divided into the CRT display character area with 32 columns x 16 lines x 1 byte, the cursor area with 32 columns x 4 lines x 1 byte and the system stack area. The display on the CRT screen is performed automatically when a numeral value in ASCII code is input in the corresponding address.

CIRCUIT DESCRIPTION

The characters are displayed asynchronously with the CPU. RAM U5 outputs data (in ASCII codes) corresponding to the address generated by the character counter formed by U83, U84a and U90a.

Character generator U3 generates the dot position data based on RAM U5 and dot counter U82.
Character generator U3 contains character data with basically 8 x 16-dot configuration, where 3 bits from D0 to D2 are the X-axis data, 4 bit from D3 to D6 are the Y-axis data and the bit of D7 is the character end control bit. The position data output from U3, U83 and U84 is converted into analog signal by D/A converters U12 and U13, sent through the analog switch of U14 and U15 and buffer amp U29a and U29b, and output as the R/O-X and R/O-Y character signals.
The analog switch of U14 and U15 switches between the character signal, cursor signal and storage waveform signal.
The character dot display on the CRT is controlled by the ROUBL signal, ROBLK signal and ROREQ signal which are output from pin 3 of U92, pin 7 of U95 and pin 12 of U95 respectively. The ROBLK signal clears the realtime waveform when it is "L". The ROREQ signal switches between the realtime waveform and read-out data and the read-out data is selected when it is "L". The ROUBL signal displays the dot display of read-out data when it is "L".
These signals vary depending on the display modes and the timings are as shown in Fig. 2. In realtime display mode, the realtime waveform is cleared by the ROBLK signal and character interrupt occurs every 2 to 10 µs.
In the storage display mode, the R/O characters and the storage waveforms are displayed alternately. When the R/O characters have been displayed for 2 screens, pin 8 of U48 goes "L", pin 11 of U72 outputs the triggering pulse to activate the timer of U27, and "H" is displayed for about 30 µs to leave the time for switching of the analog switch of U14 and U15. After switching by U14 and U15, the WAVETRG
G signal goes "L", the Storage Unit sends the storage waveform signal and the storage waveform display starts. After the storage waveform display, the MOJITRG signal clears the flip-flop of U48 and the R/O character display starts again.



High Voltage Unit (X68-1590-00)

This unit has the purpose of generating the high voltage for driving the CRT.
The unblanking signal applied from the H Unit is modulated with the 300 Vp-p sine wave which is output from the HV block. For the high voltage generated in the HV Unit, the control for maintaining the voltage constant is applied by Q1, Q2 and U1.
The modulated wave obtained from the unblanking signal is demodulated, it is DC regenerated with this high DC voltage so that the demodulated unblanking signal becomes a HV signal.
This circuit incorporates an auto focusing circuit formed with Q3 and Q4 so that the focusing is not changed when the INTEN control is adjusted. The voltage for use in acceleration in the subsequent stage is also generated in the HV block.

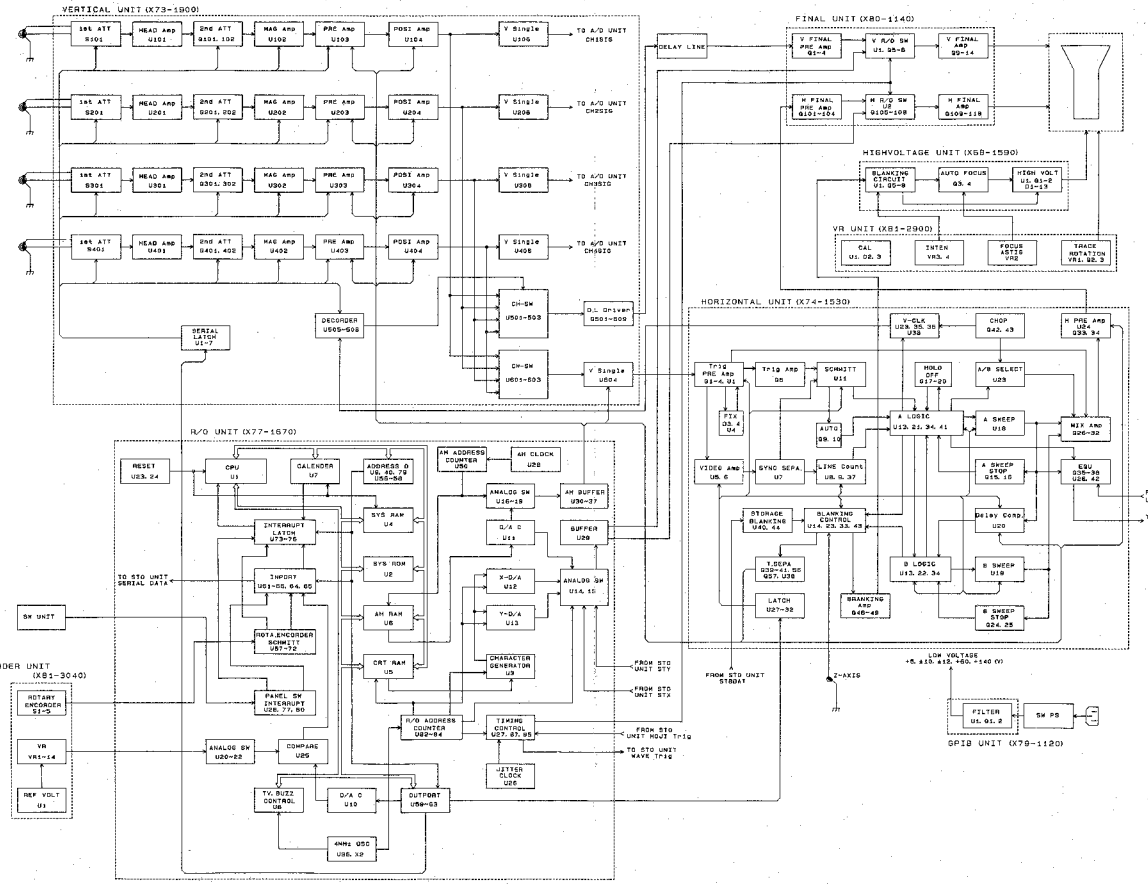
GP-IB Unit (X79-1120-00)

This unit incorporates the RS-232C and GP-IB interface circuits which are used when a computer and/or plotter is connected externally to the oscilloscope.
The communications through RS-232C uses buffer U101. The circuit for communications through GP-IB is composed of buffers U102 and U103, GP-IB controller U105 and address setting dip switch S101.
These interfaces are in compliance with the HP-GL and IEEE488 respectively.

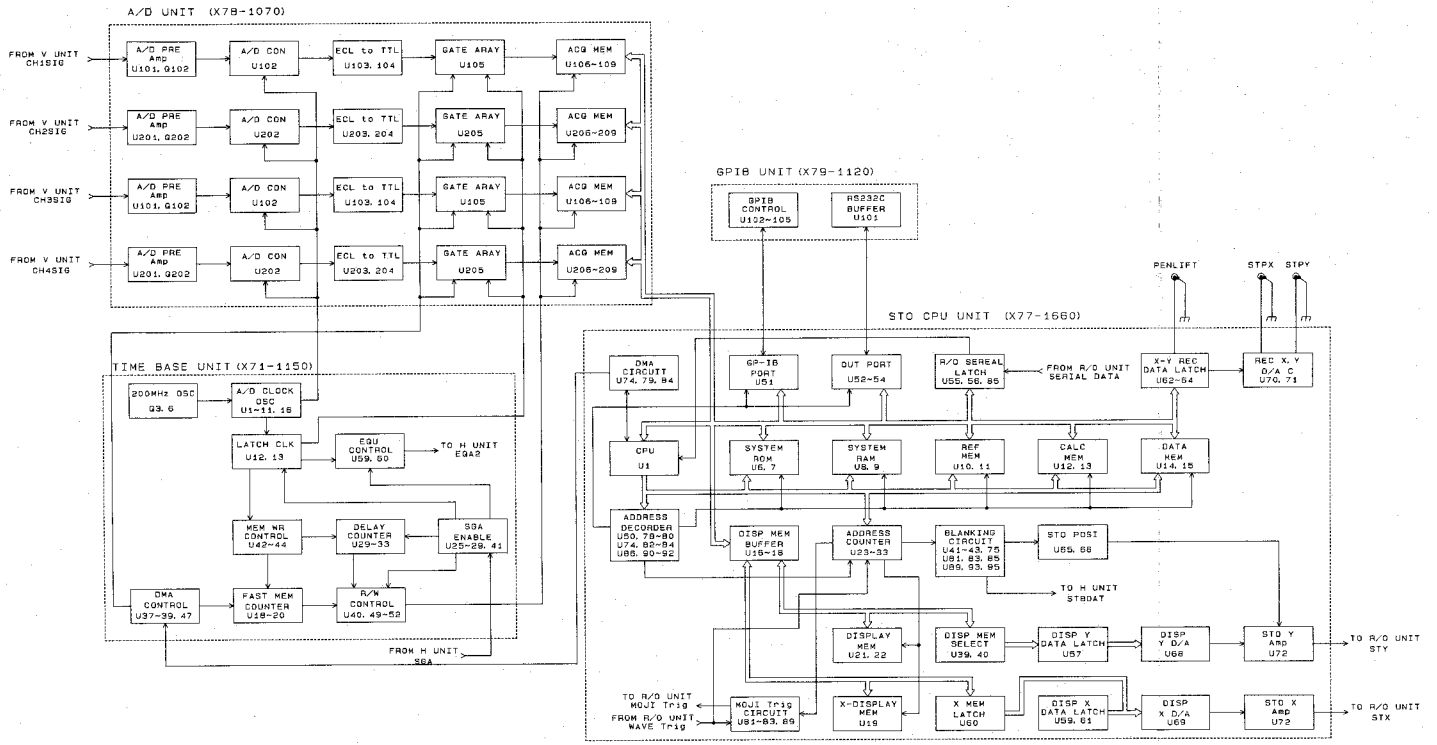
VR Unit (X81-2900-00)

This unit is in charge of the INTEN adjustment, FOCUS ASTIG adjustment, trace rotation adjustment, illumination adjustment and the CAL signal output.
The CAL signal to be output is generated with the 1 kHz, 1 Vp-p square wave generator and U1.

BLOCK DIAGRAM



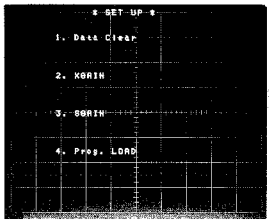
BLOCK DIAGRAM


A/D UNIT (X78-1070)
FROM V UNIT CH1SIG
FROM V UNIT CH2SIG
FROM V UNIT CH3SIG
FROM V UNIT CH4SIG
A/D PRE Amp U101, 0102
A/D PRE Amp U201, 0202
A/D CON U102
A/D CON U202
ECL to TTL U103, 104
ECL to TTL U203, 204
GATE ARAY U105
GATE ARAY U205
ACQ MEM U106-109
ACQ MEM U206-209
TIME BASE UNIT (X71-1150)
200MHz OSC Q3, 6
A/D CLOCK OSC U1-11, 16
LATCH CLK U12, 13
EQU CONTROL U59, 60
TO H UNIT EQA2
MEM WR CONTROL U42-44
DELAY COUNTER U29-33
S&A ENABLE U25-29, 41
DMA CONTROL U37-39, 47
FAST MEM COUNTER U18-20
R/W CONTROL U40, 49-52
FROM H UNIT S&A
GPIB UNIT (X79-1120)
GPIB CONTROL U102-105
RS232C BUFFER U101
STO CPU UNIT (X77-1660)
PENLIFT
STPX
STPY
DMA CIRCUIT U74, 79, 84
GP-IB PORT U51
OUT PORT U52-54
R/O SEREAL LATCH U55, 56, 85
FROM R/O UNIT SERIAL DATA
X-Y REC DATA LATCH U62-64
REC X, Y D/A C U70, 71
CPU U1
SYSTEM ROM U6, 7
SYSTEM RAM U8, 9
REF MEM U10, 11
CALC MEM U12, 13
DATA MEM U14, 15
ADDRESS DECORDER U50, 79-80 U74, 80-84 U86, 90-92
DISP MEM BUFFER U16-18
ADDRESS COUNTER U23-33
BLANKING CIRCUIT U41-43, 75 U81, 83, 85 U89, 93, 95
STO POSI U65, 66
TO H UNIT STBOAT
DISPLAY MEM U21, 22
DISP MEM SELECT U39, 40
DISP Y DATA LATCH U57
DISP Y D/A U68
STO Y Amp U72
TO R/O UNIT STY
TO R/O UNIT MOJI Trig
FROM R/O UNIT WAVE Trig
MOJI Trig CIRCUIT U83-88, 89
X-DISPLAY MEM U19
X MEM LATCH U60
DISP X DATA LATCH U59, 61
DISP X D/A U69
STO X Amp U72
TO R/O UNIT STX

ADJUSTMENT

Operation before adjustment (from the power-off state)

① Turn the power on pressing MENU NEXT and F5 simultaneously.
② Press MENU NEXT once.



Changes to the DISPLAY mode.

③ Press F1 once. (1. Data Clear)
At this point, the monitor is kept unchanged.
④ Press MENU NEXT twice, and the mode changes to normal.

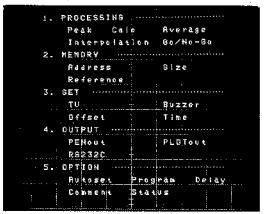
The procedures above are not necessary for the second adjustment and on.
However, when the power has been interrupted before performing adjustment operation again, only ① of the procedures above must be performed.

Now, let's start the adjustment operation.

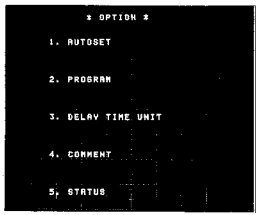
PROGRAM MODE

Adjust each center using the following commands:

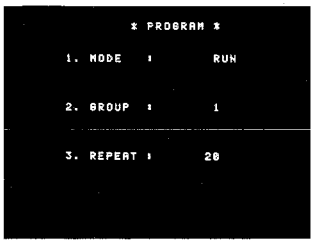
① Turn MENU NEXT on.



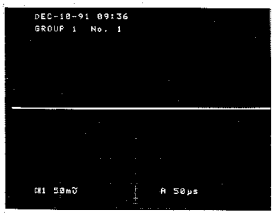
② Turn F5 on. OPTION mode



③ Turn F2 on. PROGRAM mode
④ Turn F1 on. RUN mode



⑤ Turn MENU NEXT on by pressing it once.



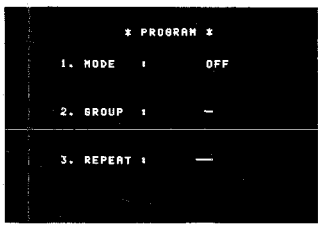
Center adjustment is available in the state of ⑥.
⑥ Adjust each adjustment VR following the procedures for each item so that each item is in the center position of its scale.
* While performing the adjustment operation, make sure not to turn the VRs on the panel related to the corresponding adjustment VR.

Example: While adjusting the V.POSI center, never turn the ⏚ POSI VRs for the channels CH1 to CH4 on the panel.

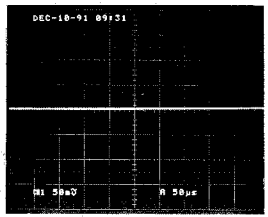
* When any related VR is turned, the center position is canceled and it does not function as an electric center. If this is the case, perform the steps ① to ④ again and press F1 three times for cancellation.
RUN → EDIT → FF → RUN
Then perform the step ⑤.
* From now on, perform the same procedures also when an error is made in operation.

After the adjustment operation is completed,

⑦ Perform the steps ① to ④ and turn the RUN mode off.
Press F1 twice in the step ④.



⑧ Press MENU NEXT three times to change the mode back to normal.



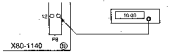
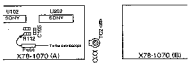
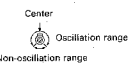
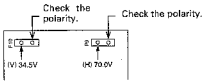
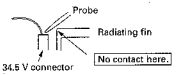
* Successful when the display has changed as shown in the photo above. However, the range varies depending on each condition.
GROUP 1 No.1 disappears.

To these adjustment procedures, an indication of "PROGRAM mode" is specified in the adjustment.

Items to be adjusted in PROGRAM mode:
1. V.POSI center (CH1 to CH4)
2. FIX
3. TRIG level center
4. DC. CUP (CH1)
5. A.SWEEP POSI 1 ms
6. MAG center 1 ms
7. X-POSI
8. STO V.POSI center (CH1 to CH4)

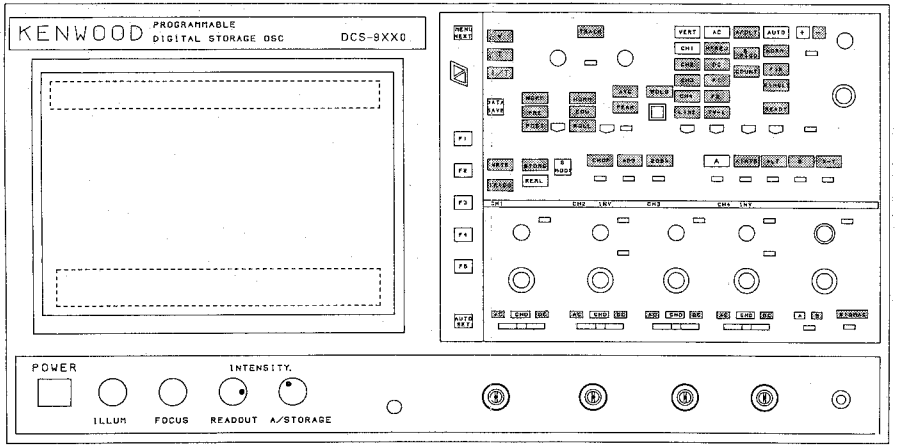
However, the items 2 to 4 are described as normal adjustment procedures.
They also can be adjusted in PROGRAM mode.

ADJUSTMENT

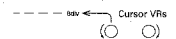
Item	Adjustment	PCB	Procedure
+10.00 V	VR1	X79-1200	Apply the probe to No.12 of P8 of X80-1140 and adjust the voltage so that it falls between 10.00 and 10.05 V. 
100 MHz oscillation (STO mode SWEEP TIME: 0.1 µs Luminescent line center)	TC2	X71-1150	Apply the probe to R112 and adjust to the center of the TC2 oscillation range.  
INTENSITY	VR1	X68-1590	CH1, CH2, VOLTS: 20 mV, VARI: min. 20 MHz Bw: ON, CH2: ON SOURCE: CH1, AC-DC: GND ① Select X-Y for HORIZ mode. ② Set INTEN VR so that it rotates between . ③ Adjust so that deletion is performed in the position of 9:30. Adjust so that the spot comes to the center of the screen.
FOCUS Center	VR2	X68-1590	① In the state of the step '40 MHz oscillation', adjust ASTIG (PULL) to minimize the size of the spot. ② Set FOCUS VR so that it rotates between , then set it to the mechanical center position. ③ Adjust VR2 so that the spot is minimized.
V. Output Bias Voltage H. Output Bias Voltage	VR201 (34.5 V) VR102 (70.0 V)	X80-1140	① In the state of the step 'Intensity' (with the spot in the center of the screen), turn R/O INTEN off. (INTEN is between 12:00 and 1:00 positions.) ② Adjust each VR so that the voltage is those indicated by (V) and (H) respectively.  NOTE) Take care that the radiating fin does not come in contact with the probe during voltage adjustment.  (* The value of (H) has been changed from 67.5 to 70.0 V because the voltage is lowered due to time drift while contained in a case.)

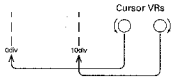
ADJUSTMENT

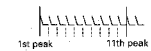
Step 'R/O Offset' VR Setting (Example) Set the display for CH1. R/O INTEN: ON INTEN: Arbitrary



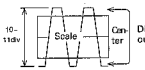
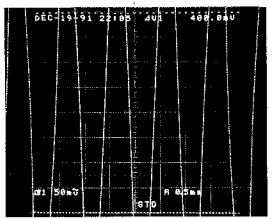
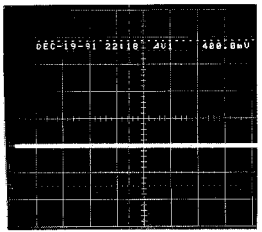
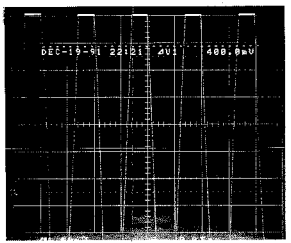
Item		Adjustment	PCB	Procedure
R/O Offset	Y	VR3 (POSI) VR4 (Gain)	X80-1140	Set the VRs above. ① Turn [ΔV] on. ② Rotate each cursor VR fully to its maximum side. ③ Adjust VRs 3 and 4 so that each line cursor corresponds to the maximum position of each VR in the vertical (Y) ↕ direction. ④ Turn [ΔT] on. ⑤ Rotate each cursor VR fully to its maximum side. ⑥ Adjust VRs 103 and 101 so that each line cursor corresponds to the maximum position of each VR in the horizontal (X) ↔ direction. ⑦ Turn [ΔT] off by pressing it twice.
	X	VR103 (POSI) VR101 (Gain)		
STO X-Gain		VR2	X77-1660	① Turn [SCOPE MODE] on. (STORAGE action) ② Set SWEEP TIME to 1 ms. ③ Input a marker signal of 1 ms to CH1. ④ Adjust so that the peaks of the marker waveforms are correspondent to each division.



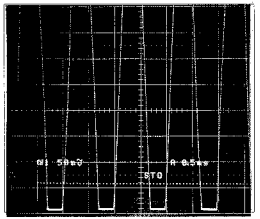
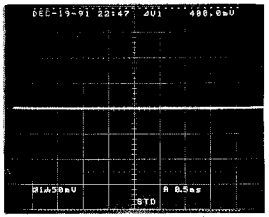




ADJUSTMENT

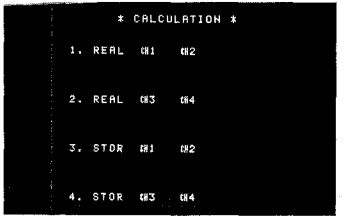
Item	Adjustment	PCB	Procedure
STO Y-Gain * Adjustment is performed by a program using pattern waveforms. (The program has already been provided.)	VR1 (Gain) VR3 (POSI)	X77-1660	① Turn SCOPE MODE on. (STORAG action) ② Turn ΔV on. Locate each line cursor to its maximum position. ③ Set the AC-VOLTS of CH1 AC-DC to 20 mV and locate the luminescent line in the center scale using ⟠ POS. ④ Input a sine wave of 1 kHz ∿ and adjust so that the amplitude extends over approx. 15 divisions in the vertical direction ↕. (Input excessively so that the waveform extends out of the scale range.)  Distort the waveforms out of the scale range * Never rotate ⟠ POSI at this point. If rotated, the center position of the luminescent line will move.  ⑤ Adjust VR3 of X80-1140 described in the step No.7 so that line cursor on the scale is 1.1 div apart from the upper limit of the scale.  1.1 div No waveform is displayed for good understanding. ⑥ Adjust VR1 so that the peaks of the waveform are on the upper limit of the scale.  Align.

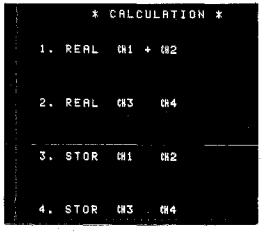
ADJUSTMENT

Item	Adjustment	PCB	Procedure
STO Y-Gain			⑦ Adjust VR3 so that the waveform is completely symmetrical in the vertical direction.  Set to 1.1 div using VR3 of X80-1140. ⑧ Align the line cursor with the division using VR3 of X80-1140. At this point, it is not required to display a waveform on the screen.  ⑨ Turn ΔT off. ⑩ Turn SCOP MODE on and change the mode to REAL.
CH1 10kHz Square Wave (REAL) 10kHz ↓ (STO) 10kHz ← ↓ (STO) 100kHz	VR101 TC103	X73-1900	VOLTS: 10 mV AC-DC: AC SWEEP TIME: 20 µs ① Input a square wave of 10 kHz ⊓⊔ to CH1 and adjust so that the amplitude extends over 6 divisions. ② Shape the leading edge of the waveform. TC 103 changes around here. Procedure: REAL 10 kHz → STO 10 kHz → STO 100 kHz As there is a certain relationship between 10 kHz adjustment and 100 kHz adjustment, make sure to check the values several times.
CH2 10 kHz Square Wave	VR201 TC203	X73-1900	Adjust in the same way as for CH1.
CH3 10 kHz Square Wave	VR301 TC303	X73-1900	Adjust in the same way as for CH1.
CH4 10 kHz Square Wave	VR401 TC403	X73-1900	Adjust in the same way as for CH1.
CH1 ATT Balance	VR102 (1 mV to 2 mV) VR104 (2 mV to 5 mV)	X73-1900	VOLTS: 2 mV AC-DC: GND VARI: CAL (Turn 20 MHzB/W on as required.) ① For 1 to 2 mV, perform adjustment when the voltage is 1 mV with 2 mV as reference. ② For 2 to 5 mV, perform adjustment when the voltage is 2 mV with 5 mV as reference.

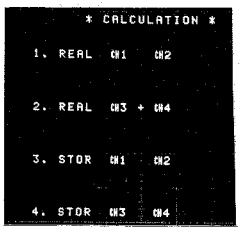
ADJUSTMENT

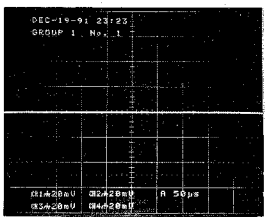
Item	Adjustment	PCB	Procedure
CH1 VARI Balance	VR107	X73-1900	VOLTS: 10 mV AC-DC: GND Perform adjustment when VARI VR is set to MAX (i.e. CAL) with MIN as reference. MIN → CAL (Reference) (ADJ)
CH2 ATT Balance	VR202 (1 mV to 2 mV) VR204 (2 mV to 5 mV)	X73-1900	① For 1 to 2 mV, perform adjustment when the voltage is 1 mV with 2 mV as reference. ② For 2 to 5 mV, perform adjustment when the voltage is 2 mV with 5 mV as reference.
CH2 INV Balance ↑ As VARI BAL is also dislocated, adjust it again.	VR206	X73-1900	Adjust so that the luminescent line does not move even when the INV switch is turned on and off.
CH2 VARI Balance	VR207	X73-1900	Perform adjustment when VARI VR is set to MAX (i.e. CAL) with MIN as reference. (Reference) (ADJ) CAL
CH3 ATT Balance	VR302 (1 mV to 2 mV) VR304 (2 mV to 5 mV)	X73-1900	Adjust in the same way as for CH1.
CH3 VARI Balance	VR307	X73-1900	Adjust in the same way as for CH1.
CH4 ATT Balance	VR402 (1 mV to 2 mV) VR404 (2 mV to 5 mV)	X73-1900	Adjust in the same way as for CH2.
CH4 INV Balance ↑ As VARI BAL is also dislocated, adjust it again.	VR406	X73-1900	Adjust in the same way as for CH2.
CH4 VARI Balance	VR407	X73-1900	Adjust in the same way as for CH2.
CH1/CH2 ADD Center	VR501	X73-1900	① Press MENU NEXT once. ② Press F1 once. ③ Press F2 once. ④ Press F1 once. 1. REAL CH1 + CH2 ↑ + is inserted. ⑤ Press MENU NEXT three times to return to NORMAL. ⑥ Display the luminescent lines for CH1 and CH2. ⑦ Turn ADD on. There are three luminescent lines now. ⑧ Move these three luminescent lines using CH1, CH2 and POS1 so that they overlap one another. ⑨ Adjust so that the luminescent lines are in the scale center. ⑩ Turn ADD off.



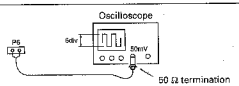
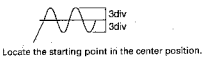


ADJUSTMENT

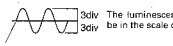
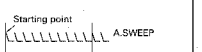
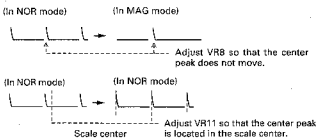
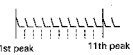
<table>
<tr><th>Item</th><th>Adjustment</th><th>PCB</th><th>Procedure</th></tr>
<tr><td>CH3/CH4 ADD Center</td><td>VR502</td><td>X73-1900</td><td>① Press MENU NEXT twice.
② Press F1 once.
③ Press F2 once.
④ Press F1 once. (Delete + for CH1/CH2.)
⑤ Press F2 once.
2. REAL CH3 + CH4
↑
+ is inserted.
 

⑥ Press MENU NEXT three times to return to NORMAL.
⑦ Display the luminescent lines for CH3 and CH4.
Turn off CH1 and CH2 for this step.
⑧ Turn ADD on. (If it is already lit on, keep it as it is.) There are three luminescent lines now.
⑨ Move these three luminescent lines using CH3, CH4 and POSI so that they overlap one another.
⑩ Adjust so that the luminescent lines are in the scale center.
⑪ Turn ADD off.</td></tr>
<tr><td>V.POSI Center
↓
STO V.POSI Center</td><td>VR109 (CH1)
VR209 (CH2)
VR309 (CH3)
VR409 (CH4)</td><td>X73-1900</td><td>① Change the mode to PROGRAM.
② Turn on CH1, CH2, CH3 and CH4.
③ Set VOLTS to 20 mV (CH1 to CH4).
④ Set AC-DC to GND (CH1 to CH4).
⑤ Adjust so that all the luminescent lines for each channel overlap one another in the scale center.
NOTE) Take care not to rotate ⊕ POSI before adjustment.
 
</td></tr>
<tr><td>V.Gain</td><td><table><tr><th></th><th>10 mV</th><th>1 mV</th></tr><tr><td>CH1</td><td>VR108</td><td>VR103</td></tr><tr><td>CH2</td><td>VR208</td><td>VR203</td></tr><tr><td>CH3</td><td>VR308</td><td>VR303</td></tr><tr><td>CH4</td><td>VR408</td><td>VR403</td></tr></table></td><td>X73-1900</td><td>VOLTS: 10 mV, VARI: CAL
① Input a 50 mV square wave ⊓⊔ of 1 kHz and adjust so that the amplitude extends over 5 divisions.
② Change VOLTS to 1 mV. Then input a 5 mV square wave ⊓⊔ and adjust so that the amplitude extends over 5 divisions.
Adjust CH1 to CH4 repeating the steps ① and ②.</td></tr>
</table>

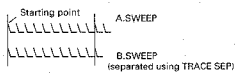
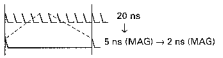
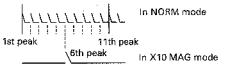
ADJUSTMENT

Item	Adjustment	PCB	Procedure
VARI Gain	VR1	X73-1900	VOLTS: 10 mV VARI: CAL ① Input a 50 mV square wave ⊓⊓ to CH1. Then check to make sure that the amplitude extends over 5 divisions. ② Adjust so that the amplitude extends over 1.5 divisions when VARI is set to MIN (◯). ③ Set VARI to CAL and check to make sure that the amplitude extends over 5 divisions. * If GAIN has been dislocated, adjust it again. ④ For CH2 – CH4, perform step (1) then check to make sure that the amplitude does not extend over 1.8 divisions or greater when VARI is set to MIN (◯).
CH1 Waveform Shaping	TC105 (0.1 V) TC107 (1 V)	X73-1900	VOLTS 10 mV Ideal waveform ① Adjust so that the waveforms for 0.1 V and 1 V are flat.
CH2 Waveform Shaping	TC205 (0.1 V) TC207 (1 V)	X73-1900	Adjust in the same way as for CH1.
CH3 Waveform Shaping	TC305 (0.1 V) TC307 (1 V)	X73-1900	Adjust in the same way as for CH1.
CH4 Waveform Shaping	TC405 (0.1 V) TC407 (1 V)	X73-1900	Adjust in the same way as for CH1.
CH1 Input Capacity	TC106 (0.1 V) TC108 (1 V)	X73-1900	① Measure the capacity when VOLTS is 10 mV. ② Adjust so that the capacities for 0.1 V and 1 V are the same as that for 10 mV.
CH2 Input Capacity	TC206 (0.1 V) TC208 (1 V)	X73-1900	Adjust in the same way as for CH1.
CH3 Input Capacity	TC306 (0.1 V) TC308 (1 V)	X73-1900	Adjust in the same way as for CH1.
CH4 Input Capacity	TC406 (0.1 V) TC408 (1 V)	X73-1900	Adjust in the same way as for CH1.
TRIG AMP 1 kHz Square Wave	VR612 (for all over the range) TC601 (for the high frequency range)	X73-1900	VOLTS: 10 mV ① Pull out the P6 connector of X73-1900 and insert a jig.  ② Input a square wave ⊓⊓ of 1 kHz to CH1 and adjust so that the amplitude extends over 6 divisions on the oscilloscope. ③ Adjust so that the waveforms look well-proportioned. (Waveform shaping)
TRIG AMP 1 MHz Square Wave (F characteristics for 100 MHz) ↑ The amplitude changes through 1 MHz square wave adjustment.	HIC U604 TC1	X73-1900	① In the state of the step No.37, input a square wave ⊓⊓ of 50 kHz to CH1 and adjust so that the amplitude extends over 6 divisions on the oscilloscope. ② From this state, change the frequency to 100 MHz keeping the SG level, and adjust so that the amplitude extends over 5 divisions on the oscilloscope. ③ After adjustment is completed, insert the P6 connector.
FIX Level	VR2	X74-1530	* This item also can be adjusted in PROGRAM mode. VOLTS: 10mV AC-DC: AC SWEEP TIME: 0.2 ms ① Set TRIG MODE to FIX. ② Inter a sine wave ∿ of 1 kHz to CH1 and adjust so that the amplitude extends over 6 divisions with 3 divisions symmetrically on the upper and lower sides of the scale center.  Locate the starting point in the center position. ③ If synchronization is available, reduce the amplitude gradually using VOLTS and V.VARI, and adjust ± SLOP for synchronization. ④ Reduce the amplitude up to the maximum value of 0.5 divisions and perform the adjustment operation.

ADJUSTMENT

Item	Adjustment	PCB	Procedure
TRIG Level Center	VR1	X74-1530	* This item also can be adjusted in PROGRAM mode. VOLTS: 10 mV, AC-DC: AC, TRIG MODE: AUTO TRIG.LEVEL: Mechanical center, SWEEP TIME: 0.2 ms 1) Inter a sine wave of 1 kHz to CH1 and adjust so that the amplitude extends over 6 divisions with 3 divisions symmetrically on the upper and lower sides of the scale center. 2) Adjust so that the starting point of the waveform is located in the scale center.  The luminescent line should be in the scale center. Locate the starting point in the center. * When adjustment is performed in PROGRAM mode, never rotate TRIG. LEVEL VR before the operation is completed.
CH1 DC COUPLING	VR601	X73-1900	* This item also can be adjusted in PROGRAM mode. COUPLING should be set to AC in the state of the step 'CH1 Waveform Shaping'. ① In the state of the step 'CH1 Waveform Shaping', set SLOPE to + and check to make sure that the starting point of the waveform is located in the scale center. (If not, adjust it using TRIG LEVEL.) ② Switch COUPLING to DC and adjust the starting point to the scale center. For channels 2 to 4, only a check should be made. * When adjustment is performed in PROGRAM mode, never rotate TRIG.LEVEL VR before the operation is completed.
A.SWEEP TIME 1 ms	VR5	X74-1530	HORIZONTAL MODE: A SWEEP TIME: 1 ms, H. VARI: CAL 1) Input a marker signal of 1 ms. 2) Adjust so that every division corresponds to each peak of the marker signal one by one. (During this operation, the marker will move in the horizontal direction. Adjust it with H.POSI.)
A.SWEEP POSI	VR11	X74-1530	This item is adjusted in PROGRAM mode. ① Turn the mode to PROGRAM. ② Set SWEEP TIME to 1 ms and H.VARI to CAL. * Do not rotate H.POSI and FINE on the panel. ③ Input a marker signal of 1 ms. ④ Adjust so that the first peak of the marker signal (i.e. starting point) comes to the left end of the scale. 
MAG Gain	VR12	X74-1530	Continue from the step 'CH4 Waveform Shaping' in PROGRAM mode. ⑤ Turn X10 MAG on and adjust so that the interval between two adjacent peaks is 10 divisions. ⑥ Turn X10 MAG off.
MAG Center and A.SWEEP POSI	VR8 (MAG Center) VR11 (H.POSI)	X74-1530	Continue from the step 'CH1 Input Capacity' in PROGRAM mode. ⑦ Set the marker signal to 5 ms. ⑧ Adjust VR8 so that the center peak of the marker signal does not move even when X10 MAG is turned on/off both in NOR and MAG modes. (If the center peak is not displayed on the screen, rotate VR11 slightly, then adjust VR8.) ⑨ Turn X10 MAG off and adjust VR11 so that the center peak is located in the scale center. ⑩ Set the marker signal to 1 ms and check SWEEP TIME and A.SWEEP POSI of 1 ms again. If the error is not negligible (in other words, when the value is not within 1.5 %), perform readjustment following the steps 'CH3 Waveform Shaping' to 'CH2 Input Capacity' * Turn PROGRAM mode off. 
B.SWEEP TIME 1 ms	VR6	X74-1530	Set HORIZONTAL MODE to A and A.SWEEP TIME to 2 ms first. Next, change HORIZONTAL MODE to B, then set B.SWEEP TIME to 1 ms and B TRIG to "D". 1) Input a marker signal of 1 ms. 2) Adjust so that every division corresponds to each peak of the marker signal one by one. (During this operation, the marker will move in the horizontal direction. Adjust it with H.POSI.) * If the luminescent line B is not displayed, rotate the VR for delay time. 

ADJUSTMENT

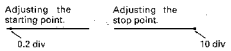
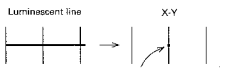
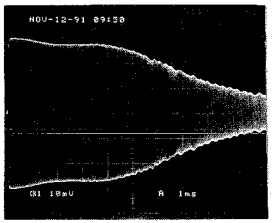
Item	Adjustment	PCB	Procedure
B.SWEEP POSI	VR9	X74-1530	Set HORIZONTAL MODE to A and A.SWEEP TIME to 1 ms first. Next, change HORIZONTAL MODE to ALT, then set B.SWEEP TIME to 1 ms and B TRIG to "D". 1) Input a marker signal of 1 ms. 2) Adjust so that the waveform of B.SWEEP overlaps that of A.SWEEP. At this point, the starting points of A. and B.SWEEP waveforms should agree. 
A.SWEEP TIME	TC1 (2 µs) TC3 (20 ns)	X74-1530	HORIZONTAL MODE: A SWEEP TIME: 2 µs 1) Input a marker signal of 2 µs. 2) Adjust so that every division corresponds to each peak of the marker signal one by one. 3) Change SWEEP TIME to 20 ns and perform the same adjustment operation.
X10 MAG	TC101 (2 ns) TC103 (5 ns)	X80-1140	HORIZONTAL MODE: A SWEEP TIME: 50 ns X10MAG: ON 1) Input a marker signal of 50 ns. 2) Adjust so that the interval between two adjacent peaks is 10 divisions. 3) Set SWEEP TIME to 2 ns and perform the same adjustment operation. 4) Change SWEEP TIME repeatedly among 20 ns, 5 ns (MAG) and 2 ns (MAG) till the best condition is obtained. 
B.SWEEP TIME	TC2 (2 µs) TC4 (20 ns)	X74-1530	Set HORIZONTAL MODE to A and A.SWEEP TIME to 5 µs first. Next, change HORIZONTAL MODE to B, then set B.SWEEP TIME to 2 µs and B TRIG to "D". 1) Input a marker signal of 2 µs. 2) Adjust so that every division corresponds to each peak of the marker signal one by one. 3) Chang SWEEP TIME to 20 ns and perform the same adjustment operation.
MAG Center 20 ns ↑ Readjust the dislocated gain for 2 ns.	TC5	X74-1530	① Set SWEEP TIME to 20 ns and input a marker signal of 20 ns. ② Adjust POSI so that every division corresponds to each peak of the marker signal one by one. ③ Turn MAG on and adjust so that the 6th peak is located in the scale center. 

MAG Center and H.POSI

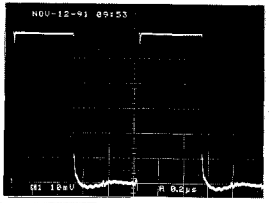
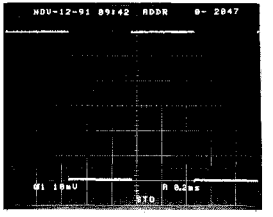
H.POSI is dislocated every time when MAG center (for 1 ms) is readjusted. Never fail to check A. and B.SWEEP POSIs and adjust them again if needed.

MAG Center	A.SWEEP POSI	B.SWEEP POSI
Readjust VR8	Dislocated	Dislocated
Stay as it is	Readjust VR11	Dislocated
Stay as it is	Stay as it is	Make the same as A.SWEEP

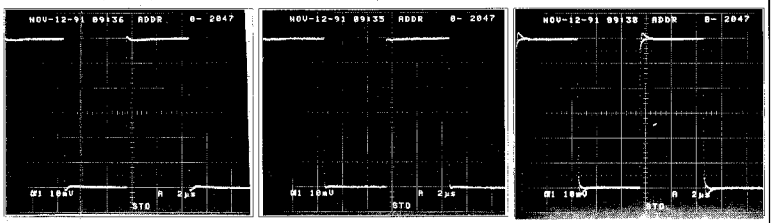
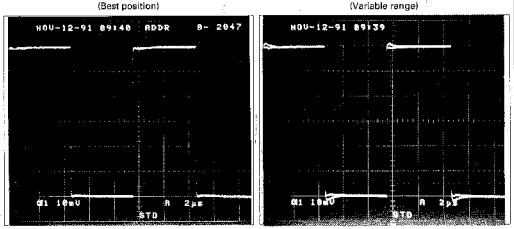
ADJUSTMENT

Item	Adjustment	PCB	Procedure
D.T.M (DELAY TIME)	VR3 (Start) VR4 (Stop)	X74-1530	HORIZONTAL MODE: ALT AC-DC: GND (for both channels) A. SWEEP TIME: 1 ms B. SWEEP TIME: 0.2 μs 1) Display 0.200 by rotating DELAY TIME POSI. 2) Set B.SWEEP to 0.2 div (Start). 3) Display 10.000 by rotating DELAY TIME POSI. 4) Set B.SWEEP to 10 div (Stop). 
CH1 X-Gain	VR7	X74-1530	H. MODE: X-Y, TRIG SOURCE: CH1 CH2: ON, CH1 VOLTS: 10mV However, do not CH1 on. CH2 VOLTS: 10 mV AC-DC: AC (for both channels) ① Input a 50 mV square wave to CH1. ② Adjust so that the amplitude extends over 5 divisions. * Make sure to perform adjustment in the center position on the screen.
CH1 X-POSI	VR10	X74-1530	This item is adjusted in PROGRAM mode. ① Change the mode to PROGRAM. ② Turn CH2 on. Then turn CH1 off. ③ Set TRIG SOURCE to CH1. ④ Set AC-DC to GND. ⑤ Check to make sure that the luminescent line is in the scale center. Then set HORI MODE to X-Y. ⑥ Adjust so that the spot comes to the center of the scale. * Take care not to rotate POSI before adjustment is completed ⑦ Turn the PROGRAM mode off. For channels 2 to 4, check each item. 
CH1 Square Wave Characteristics	VR1 Position TC1 (for the whole range) TC2 (for the mid-range) TC39 (for the whole range) TC101 (for the mid-range)	X80-1140 X73-1900	VOLTS: 5 mV AC-DC: DC ① Input a sweep signal to CH1 and adjust each TC and VR so that the waveform is as shown in the photo. However, TC101 of X73-1900 is omitted. 

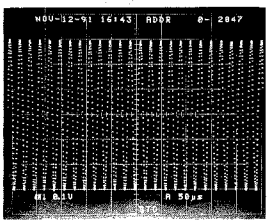
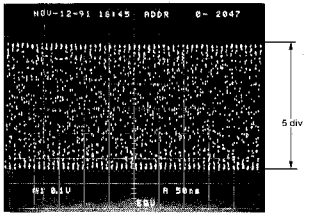
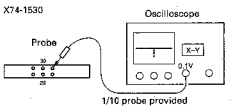
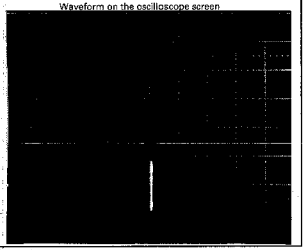
ADJUSTMENT

Item	Adjustment	PCB	Procedure
CH1 Square Wave Characteristics			② Input a square wave of 1 MHz and adjust so that the amplitude extends over 6 divisions. The waveform is as shown in the photo.  ③ Shape the overshoot using TC101 of X73-1900 and other TCs/VRs, and adjust TC1 in the final stage so that the overshoot extends over 2 divisions.
Square Wave Characteristics	TC201 (CH2) TC301 (CH3) TC401 (CH4)	X73-1900	VOLTS: 5 mV, AC-DC: DC ① Input a square wave of 1 MHz and adjust so that the amplitude extends over 6 divisions. ② Adjust so that the waveform is the same as that of CH1. Adjust each channel repeating the steps ① and ②.
CH1 STO 10 kHz Square Wave	VR112 TC102	X73-1900	Variable range of VR112 (effective for Gain and OS) Variable range of TC102 (effective for OS only) SCOPE MODE: STORAGE VOLTS: 10 mV, AC-DC: DC ① Input a square wave ⊓⊔ of 10 kHz and adjust so that the amplitude extends over approx. 5 divisions. ② Adjust so that the leading edge of the waveform is flat. Adjusted Waveform 
CH2 STO 10 kHz Square Wave	VR212 TC202	X73-1900	Adjust in the same way as for CH1.
CH3 STO 10 kHz Square Wave	VR312 TC302	X73-1900	Adjust in the same way as for CH1.
CH4 STO 10 kHz Square Wave	VR412 TC402	X73-1900	Adjust in the same way as for CH1.
STO V.Gain	VR111 (CH1) VR211 (CH2) VR311 (CH3) VR411 (CH4)	X73-1900	SCOPE MODE: STORAGE VOLTS: 10 mV, VARI: CAL, AC-DC: DC ① Input a 50 mV square wave ⊓⊔ of 1 kHz and adjust so that the amplitude extends over 5 divisions. Adjust CH1 to CH4 repeating the step ①.

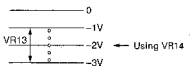
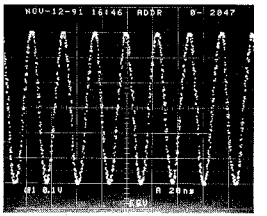
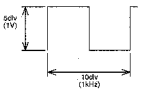
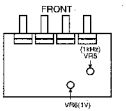
ADJUSTMENT

Item	Adjustment	PCB	Procedure
STO POSI Center	VR110 (CH1) VR210 (CH2) VR310 (CH3) VR410 (CH4)	X73-1900	① Change the mode to PROGRAM. ② Turn on CH1, CH2, CH3 and CH4. ③ Set VOLTS to 20 mV (CH1 to CH4). ④ Set AC-DC to GND (CH1 to CH4). (Adjust so that all the luminescent lines for channels 1 to 4 overlap one another in the scale center.) ⑤ Turn SCOPE MODE on to change the mode to STORAGE. ⑥ Adjust each VR so that all the luminescent lines for channels 1 to 4 are in the scale center. (Adjust so that the positions are the same as those in REAL mode.) * Take care not to rotate ⊕ POSI before adjustment is completed. ⑦ Turn the PROGRAM mode off.
CH1 STO 100 kHz Square Wave	VR101 TC101	X78-1070	SCOPE MODE: STORAGE VOLTS: 10 mV, AC-DC: DC Variable range of VR101 (effective for GAIN and OS) (Set to MIN) (Best position) (Around MAX)  Variable range of TC101 (effective for OS only) (Best position) (Variable range)  ① Input a square wave ⊓⊔ of 100 kHz and adjust so that the amplitude extends over approx. 5 divisions. ② Adjust so that the leading edge of the waveform is flat.
CH2 STO 100 kHz Square Wave	VR201 TC201	X78-1070	Adjust in the same way as for CH1.
CH3 STO 100 kHz Square Wave	VR101 TC101	X78-1070	Adjust in the same way as for CH1.
CH4 STO 100 kHz Square Wave	VR201 TC201	X78-1070	Adjust in the same way as for CH1.

ADJUSTMENT

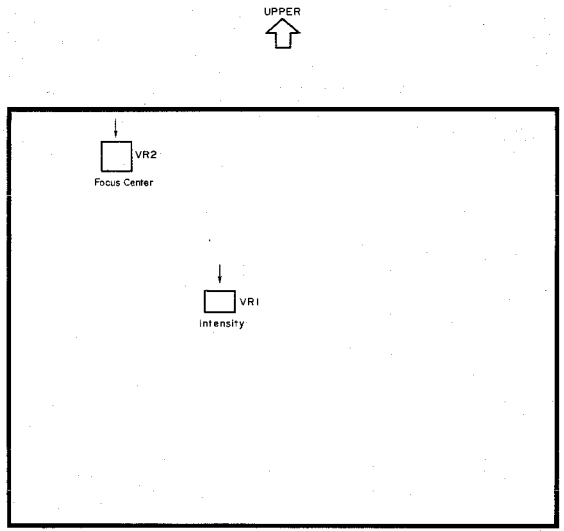
Item	Adjustment	PCB	Procedure
CH1 STO Frequency Characteristics	U106-TC1	X73-1900	SCOPE MODE: STORAGE VOLTS: 10 mV, AC-DC: DC ① Input a sine wave of 50 kHz to CH1 and adjust so that the amplitude extends over 6 divisions. ② Change the frequency to 100 MHz keeping the level of the signal generator (SG).  ③ Change the STORAGE mode from NOR to EQU. ④ Adjust so that the amplitude extends over 5 divisions. 
STO Frequency Characteristics (CH2 to CH4)	U206-TC1 (CH2) U306-TC1 (CH3) U406-TC1 (CH4)	X73-1900	Adjust each channel in the same way as for CH1.
Equivalent Sampling Offset and Gain	VR14 (Offset) VR13 (Gain)	X74-1530	SCOPE MODE: STORAGE VOLTS: 10 mV, STORAGE MODE: EQU ① Input a sine wave of 16 MHz to CH1 and adjust so that the amplitude extends over 6 divisions. ② Set VOLTS of the oscilloscope to 1 V range (i.e. 0.1 V range when the probe is used) and the mode to X-Y operation. Then adjust POSI so that the spot comes to the scale center. ③ Apply the probe to No.32 of P16 of X74-1530.  Waveform on the oscilloscope screen 

ADJUSTMENT

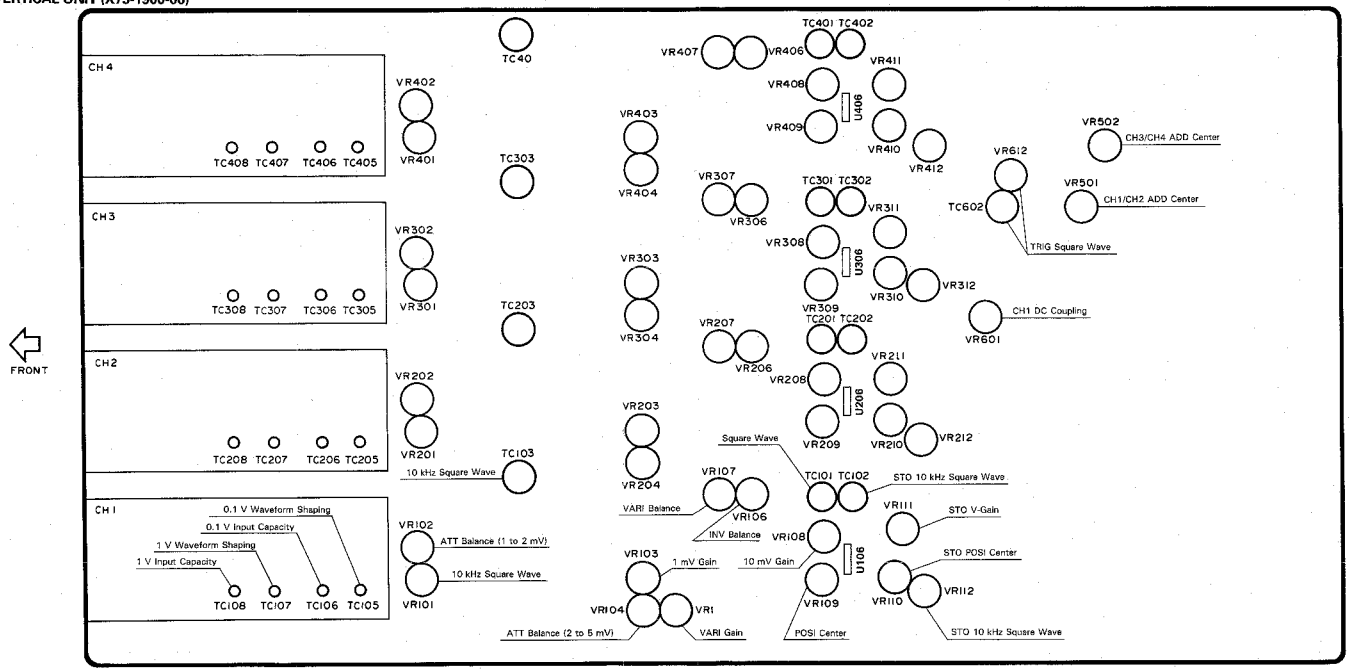
Item	Adjustment	PCB	Procedure
Equivalent Sampling Offset and Gain	VR14 (Offset) VR13 (Gain)	X74-1530	④ Adjust VR14 so that the moving center of the spot is –2 V, then adjust VR13 so that whole the movement range is 2 V.  In addition, the spot moves frequently in the vertical direction. Make sure to perform the operation correctly. ⑤ Check to make sure that there is no great gap found in the waveform of the main body. 
CAL Voltage	VR5 (1 kHz) VR6 (1 V)	X81-2900	1) Connect the calibrated oscilloscope and frequency counter with the CAL terminal and adjust as shown in the figure below.  * The figure shows the case where the oscilloscope for measurement has been set as follows: VOLTS: 0.2 V SWEEP TIME: 0.1 ms. 

ADJUSTMENT

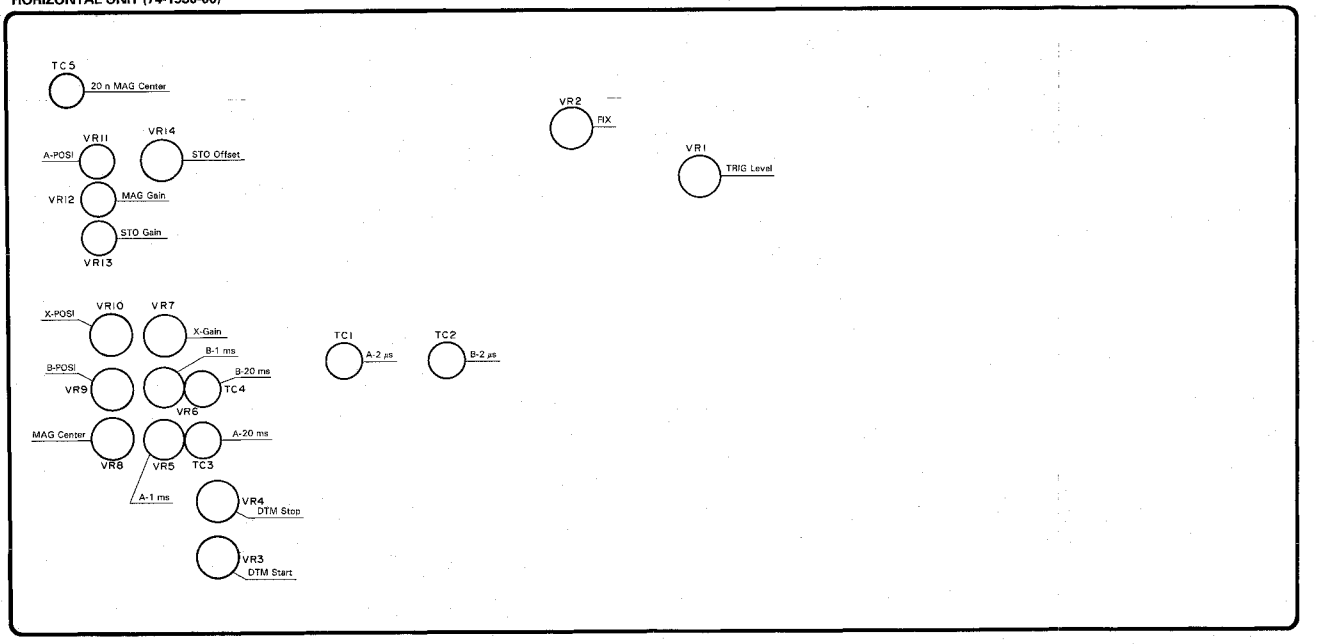
HIGH VOLTAGE UNIT (X68-1590-00)



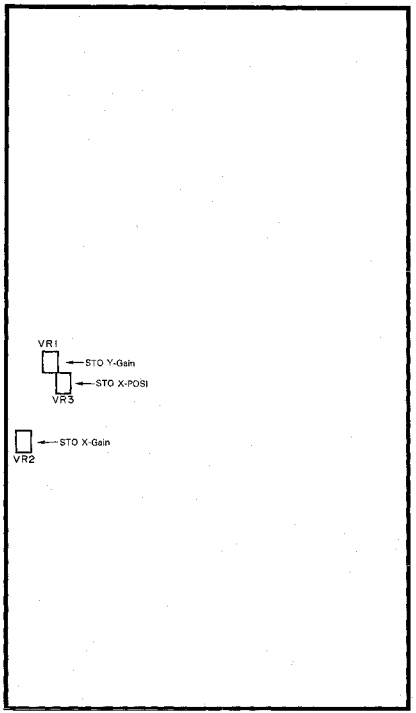
VERTICAL UNIT (X73-1900-00)



HORIZONTAL UNIT (74-1530-00)

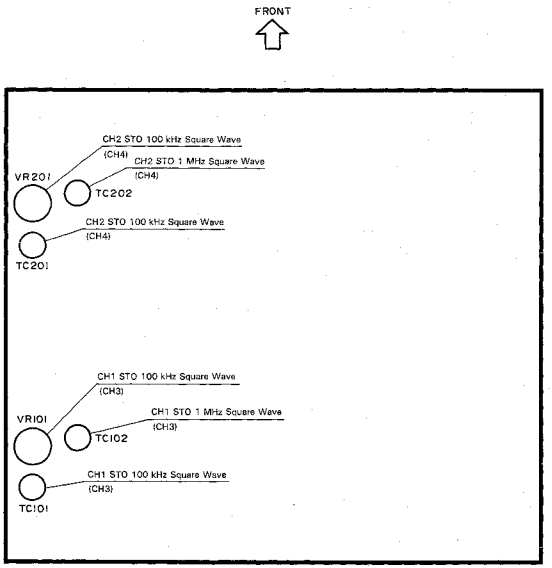


STO CPU UNIT (X77-1660-0X)



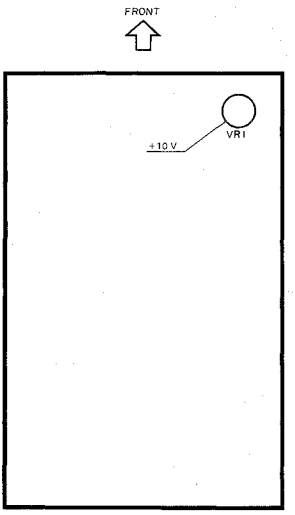
ADJUSTMENT

R/O UNIT (X78-1070-00)



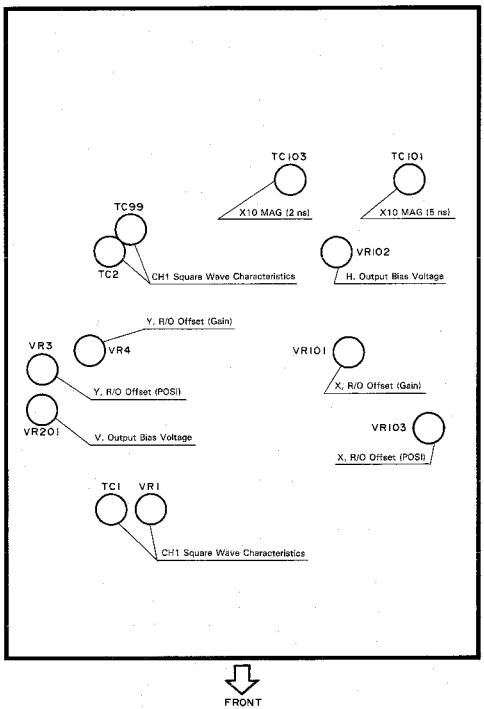
ADJUSTMENT

GPIB UNIT (X79-1120-00 A/4)



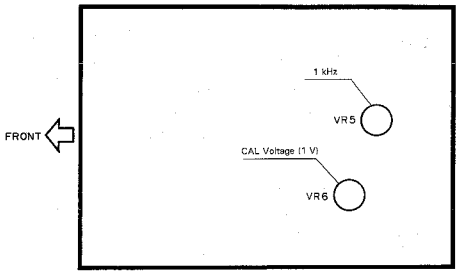
ADJUSTMENT

FINAL UNIT (X80-1140-00)



ADJUSTMENT

VR UNIT (X81-2900-00)



TROUBLESHOOTING

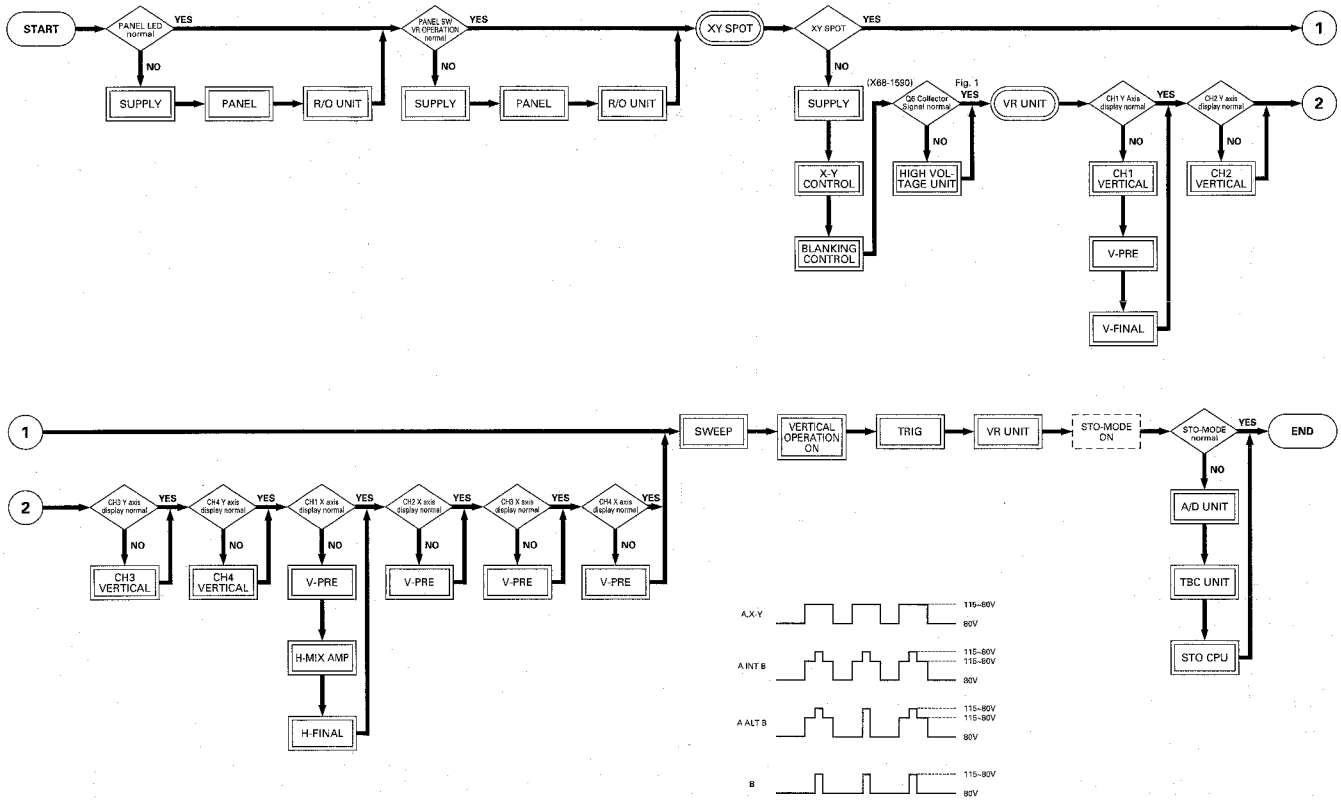
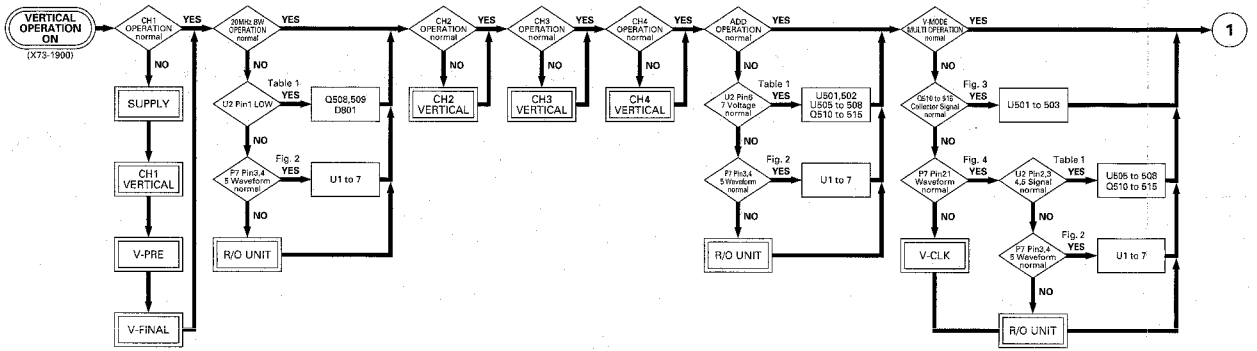
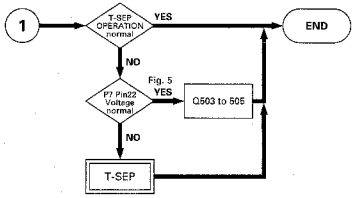
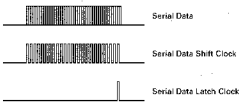


Fig.1 Q6 Collector Signal

TROUBLESHOOTING







	PANEL SW SCAN	PANEL LED Control	V UNIT Control	H UNIT Control	TBC UNIT Control
Serial Data	P27 Pin 14 SWD	P27 Pin 15 LD	P7 Pin 5 VD	P16 Pin 18 HD	P54 Pin 3 SDAD
Serial Data Shift Clock	P27 Pin 11 SWSC	P27 Pin 16 LSC	P7 Pin 3 VSC	P16 Pin 17 HSC	P54 Pin 2 SCKA
Serial Data Latch Clock	P27 Pin 12 SWLC	P27 Pin 13 LLC	P7 Pin 4 VLC	P16 Pin 19 HLC	P54 Pin 1 LCKA

Fig.2 Transration Time Chart

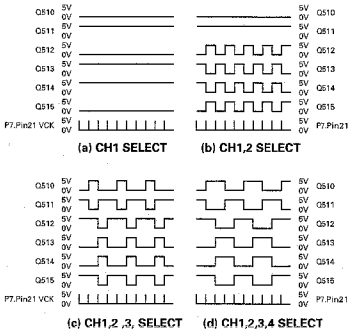


Fig.3 Q510~515 Collector Signal

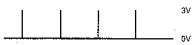


Fig.4 V-CLK Signal

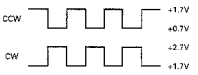


Fig.5 P7 Pin 22 TS-O

TROUBLESHOOTING

VERTICAL UNIT (From R/O)

No	Pin	Data bits	Signal Name	Content
U1	15	56	CH1INV	CH1-INV="ON" THEN "H" ELSE "L"
	1	55	CH1NOR	CH1-INV="ON" THEN "L" ELSE "H"
	2	54	CH2INV	CH2-INV="ON" THEN "H" ELSE "L"
	3	53	CH2NOR	CH2-INV="ON" THEN "L" ELSE "H"
	4	52	CH3INV	CH3-INV="ON" THEN "H" ELSE "L"
	5	51	CH3NOR	CH3-INV="ON" THEN "L" ELSE "H"
	6	50	CH4INV	CH4-INV="ON" THEN "H" ELSE "L"
	7	49	CH4NOR	CH4-INV="ON" THEN "L" ELSE "H"
U2	15	48	NULL	"L"
	1	47	BWL	BAND-WIDTH-LIMIT="ON" THEN "L" ELSE "H"
	2	46	CH1E	V-Mode=CH1 Select THEN "L" ELSE "H"
	3	45	CH2E	V-Mode=CH2 Select THEN "L" ELSE "H"
	4	44	CH3E	V-Mode=CH3 Select THEN "L" ELSE "H"
	5	43	CH4E	V-Mode=CH4 Select THEN "L" ELSE "H"
	6	42	ADD1E	V-Mode=CALC AND MENU CH1+CH2 THEN "L" ELSE "H"
	7	41	ADD3E	V-Mode=CALC AND MENU CH3+CH4 THEN "L" ELSE "H"
U3	15	40	NULL	"L"
	1	39	CH13TE	T-Source="CH1" OR "CH3"THEN "L" ELSE "H"
	2	38	CH24TE	T-Source="CH2" OR "CH4"THEN "L" ELSE "H"
	3	37	CH12TE	T-Source="CH1" OR "CH2"THEN "L" ELSE "H"
	4	36	CH24TE	T-Source="CH2" OR "CH4"THEN "L" ELSE "H"
	5	35	NULL	"L"
	6	34	NULL	"L"
	7	33	NULL	"L"
U4	15	32	NULL	"L"
	1	31	CH1DC	CH1-DC ="ON" THEN "H" ELSE "L"
	2	30	CH1GND	CH1-GND ="ON" THEN "L" ELSE "H"
	3	29	CH11/10	CH1-1/10-ATT ="ON" THEN "H" ELSE "L"
	4	28	CH11/100	CH1-1/100-ATT="ON" THEN "H" ELSE "L"
	5	27	CH1 1/4	CH1-1/4-ATT ="ON" THEN "H" ELSE "L"
	6	26	CH1MAG	CH1-MAG ="ON" THEN "H" ELSE "L"
	7	25	CH11/2	CH1-1/2-ATT ="ON" THEN "H" ELSE "L"
U5	15	24	NULL	"L"
	1	23	CH2DC	CH2-DC ="ON" THEN "H" ELSE "L"
	2	22	CH2GND	CH2-GND ="ON" THEN "L" ELSE "H"
	3	21	CH21/10	CH2-1/10-ATT ="ON" THEN "H" ELSE "L"
	4	20	CH21/100	CH2-1/100-ATT="ON" THEN "H" ELSE "L"
	5	19	CH21/4	CH2-1/4-ATT ="ON" THEN "H" ELSE "L"
	6	18	CH2MAG	CH2-MAG ="ON" THEN "H" ELSE "L"
	7	17	CH21/2	CH2-1/2-ATT ="ON" THEN "H" ELSE "L"
U6	15	16	NULL	"L"
	1	15	CH3DC	CH3-DC ="ON" THEN "H" ELSE "L"
	2	14	CH3GND	CH3-GND ="ON" THEN "L" ELSE "H"
	3	13	CH31/10	CH3-1/10-ATT ="ON" THEN "H" ELSE "L"
	4	12	CH31/100	CH3-1/100-ATT="ON" THEN "H" ELSE "L"
	5	11	CH31/4	CH3-1/4-ATT ="ON" THEN "H" ELSE "L"
	6	10	CH3MAG	CH3-MAG ="ON" THEN "H" ELSE "L"
	7	9	CH31/2	CH3-1/2-ATT ="ON" THEN "H" ELSE "L"
U7	15	8	NULL	"L"
	1	7	CH4DC	CH4-DC ="ON" THEN "H" ELSE "L"
	2	6	CH4GND	CH4-GND ="ON" THEN "L" ELSE "H"
	3	5	CH41/10	CH4-1/10-ATT ="ON" THEN "H" ELSE "L"
	4	4	CH41/100	CH4-1/100-ATT="ON" THEN "H" ELSE "L"
	5	3	CH4 1/4	CH4-1/4-ATT ="ON" THEN "H" ELSE "L"
	6	2	CH4MAG	CH4-MAG ="ON" THEN "H" ELSE "L"
	7	1	CH41/2	CH4-1/2-ATT ="ON" THEN "H" ELSE "L"

Table 1 Serial Transfer

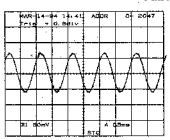


Fig.6

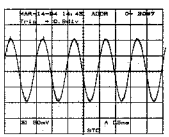


Fig.7

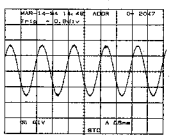


Fig.8

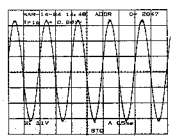


Fig.9

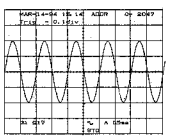
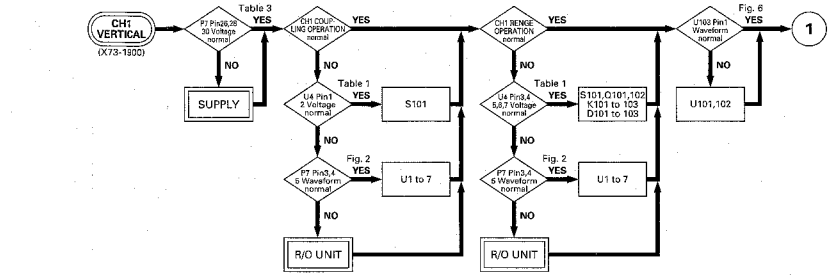
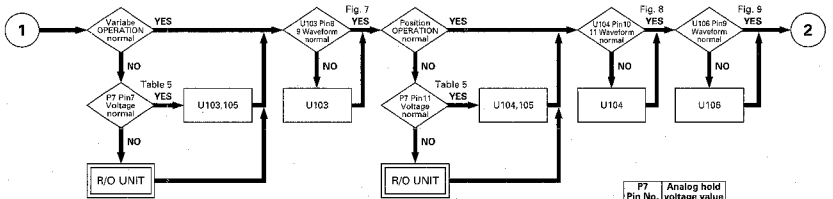
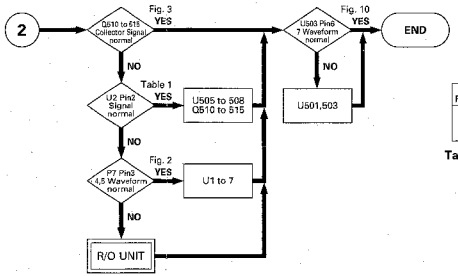


Fig.10

- 1 kHz Sine Wave
- 60 mVp-p Input
- VATT: 10 mV/div







P7 Pin No.	Analog hold voltage value
7	0~4 V
8	0~4 V
9	0~4 V
10	0~4 V
11	0~4 V
12	0~4 V
13	0~4 V
14	0~4 V

Table 5 Analog Hold Voltage

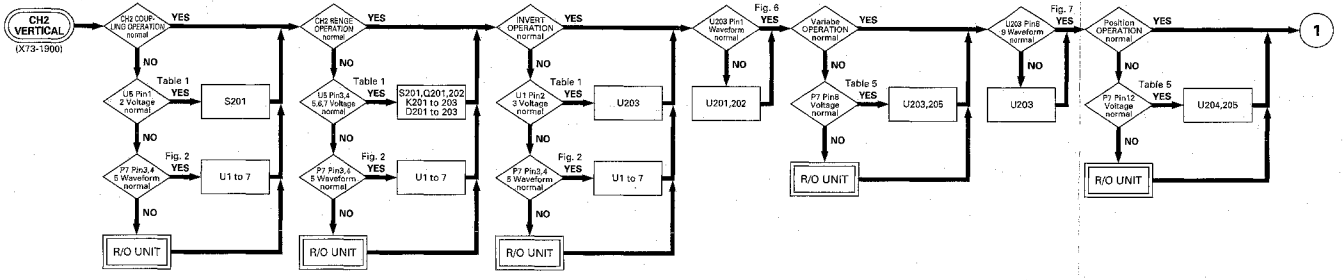
P7 Pin No.	Voltage [V]
25,26	+10
27,28	-10
29,30	+5

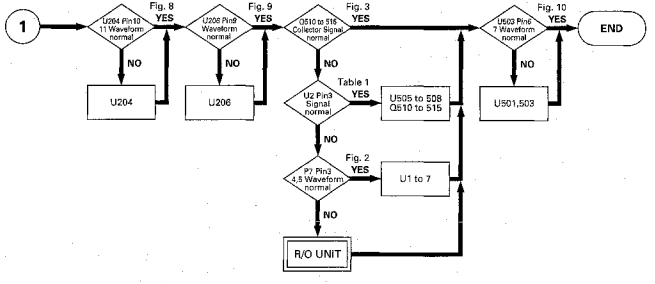
Table 3 Voltage

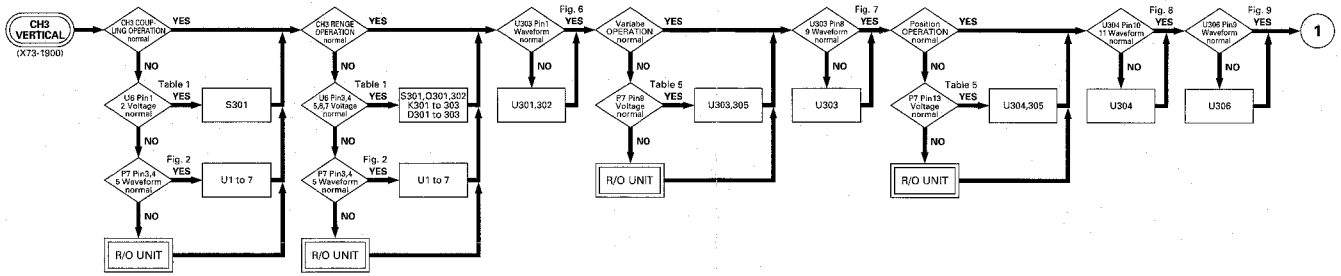
P8 Pin No.	Voltage [V]
2	+60
11,12	+10
13,14	-10
26	+140

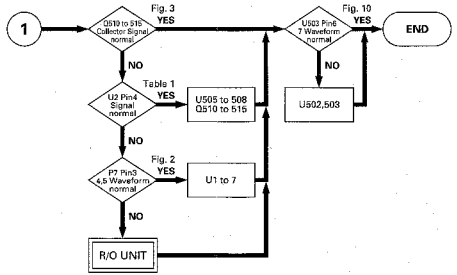
Table 4 Voltage

TROUBLESHOOTING

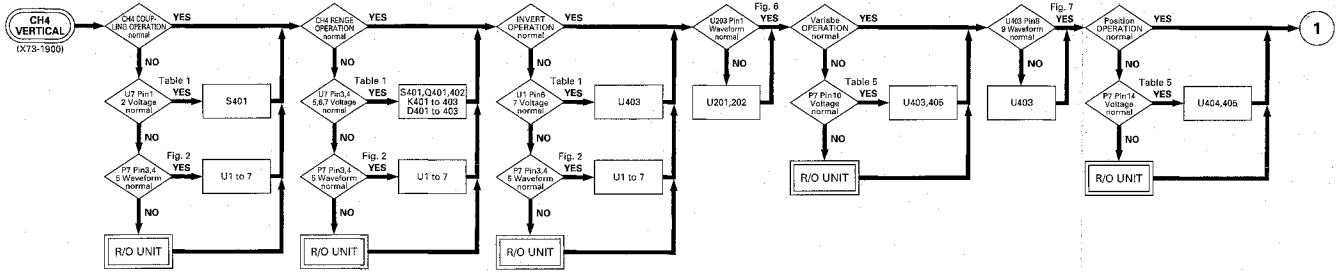


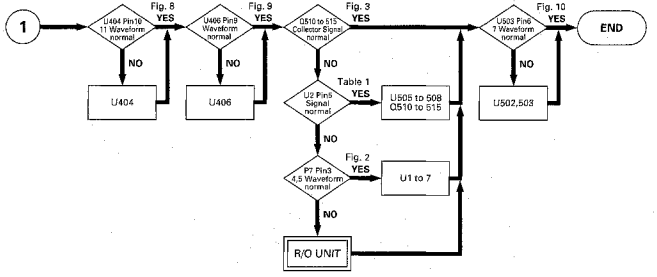



CH3 VERTICAL
(X73-1900)
CH3 COUPLING OPERATION normal
YES
NO
Table 1
U6 Pin1 2 Voltage normal
YES
S301
NO
Fig. 2
P7 Pin3,4 5 Waveform normal
YES
U1 to 7
NO
R/O UNIT
CH3 RENGE OPERATION normal
YES
NO
Table 1
U6 Pin3,4 5,6,7 Voltage normal
YES
S301,Q301,302 K301 to 303 D301 to 303
NO
Fig. 2
P7 Pin3,4 5 Waveform normal
YES
U1 to 7
NO
R/O UNIT
U303 Pin1 Waveform normal
Fig. 6
YES
NO
U301,302
Variable OPERATION normal
YES
NO
Table 5
P7 Pin9 Voltage normal
YES
U303,305
NO
R/O UNIT
U303 Pin8 9 Waveform normal
Fig. 7
YES
NO
U303
Position OPERATION normal
YES
NO
Table 5
P7 Pin13 Voltage normal
YES
U304,305
NO
R/O UNIT
U304 Pin10 11 Waveform normal
Fig. 8
YES
NO
U304
U306 Pin3 Waveform normal
Fig. 9
YES
NO
U306
1

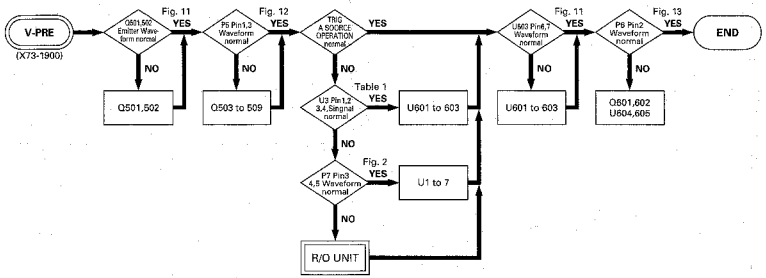

1
Q510 to 515 Collector Signal normal
Fig. 3
YES
NO
Table 1
U2 Pin4 Signal normal
YES
U505 to 508 Q510 to 515
NO
Fig. 2
P7 Pin3 4,5 Waveform normal
YES
U1 to 7
NO
R/O UNIT
U503 Pin6 7 Waveform normal
Fig. 10
YES
NO
U502,503
END

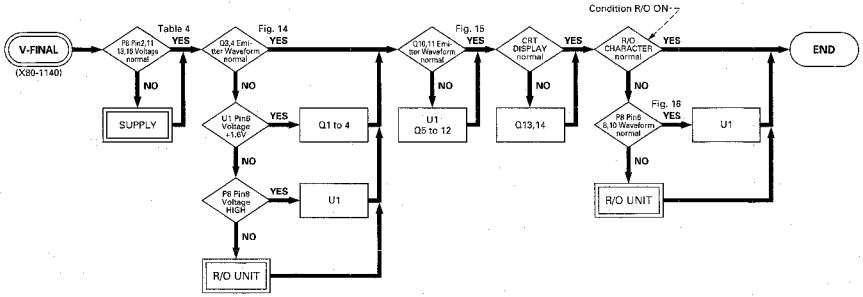
TROUBLESHOOTING





TROUBLESHOOTING





- 1 kHz Sine Wave
- 60 mVp-p Input
- VATT: 10 mV/div

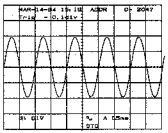


Fig.11

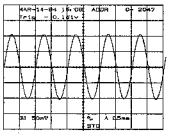


Fig.14

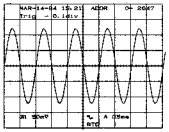


Fig.12

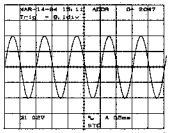


Fig.15

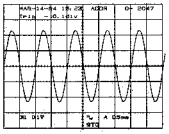
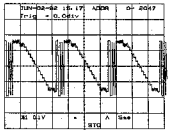
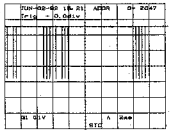


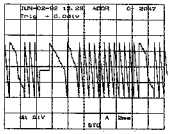
Fig.13



(a) P8 Pin6 R/O Y



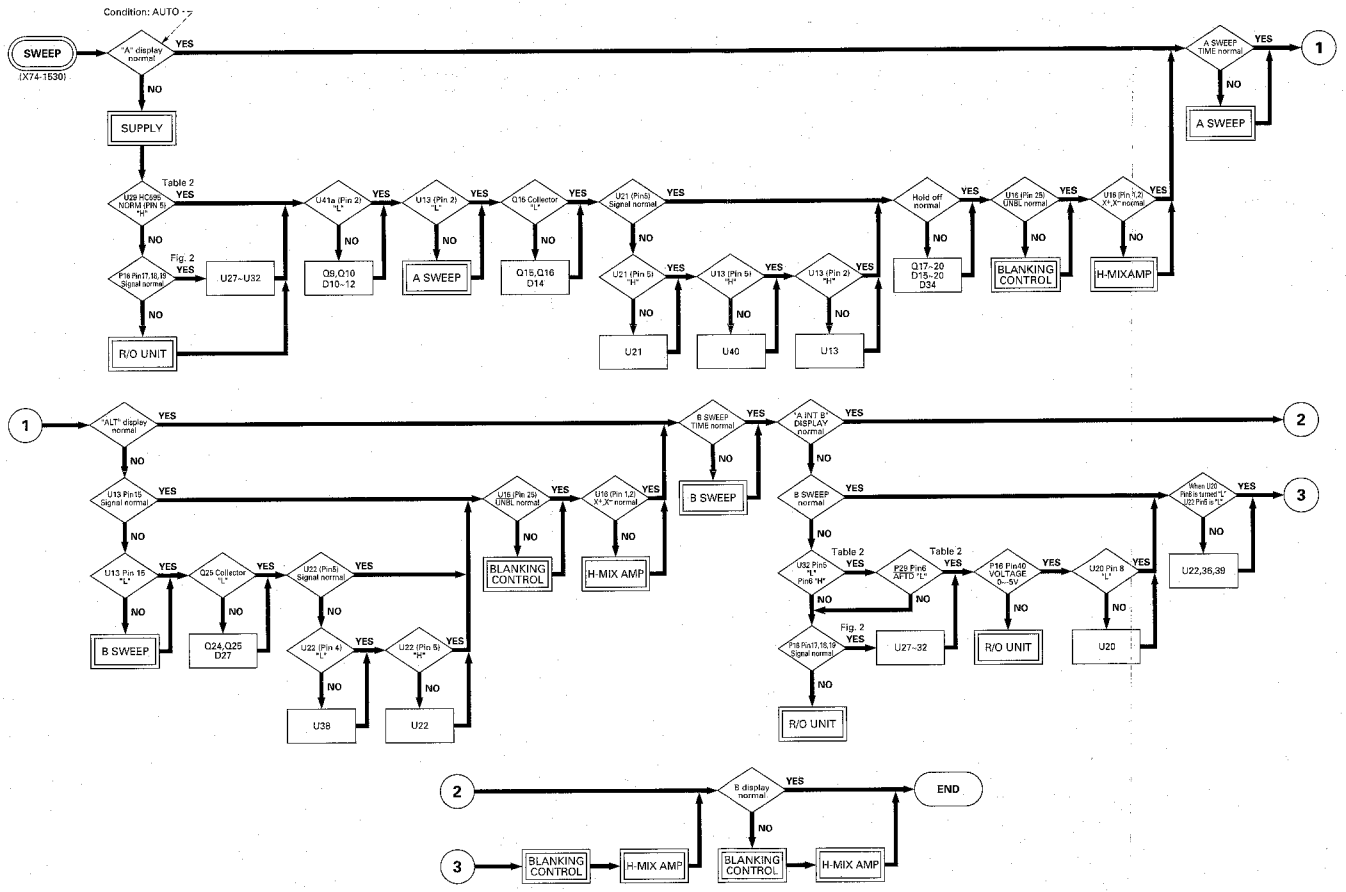
(b) P8 Pin8 R/O REQ



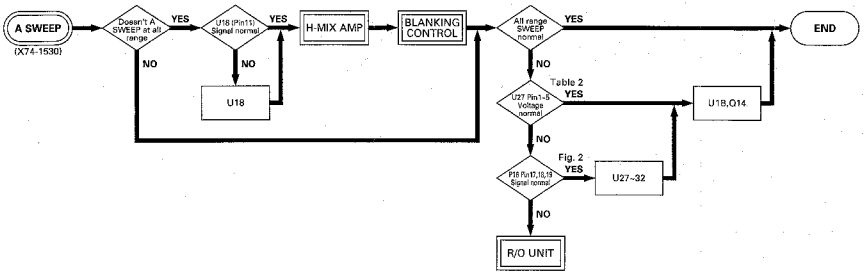
(c) P8 Pin10 R/O X

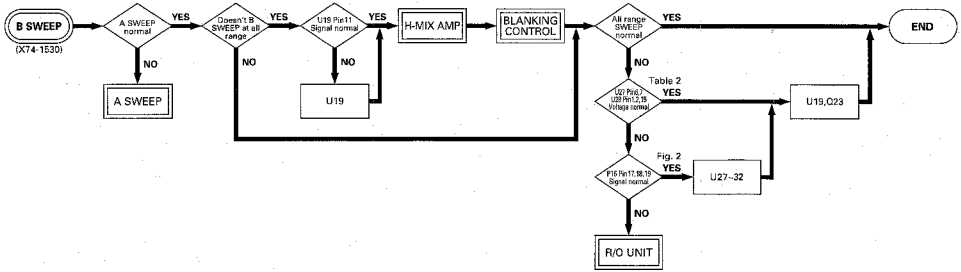
Fig.16

TROUBLESHOOTING



TROUBLESHOOTING





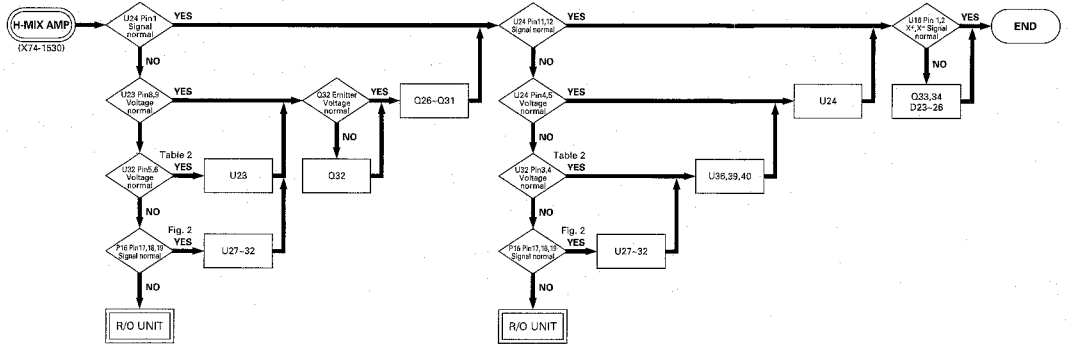
HORIZONTAL UNIT (From R/O)

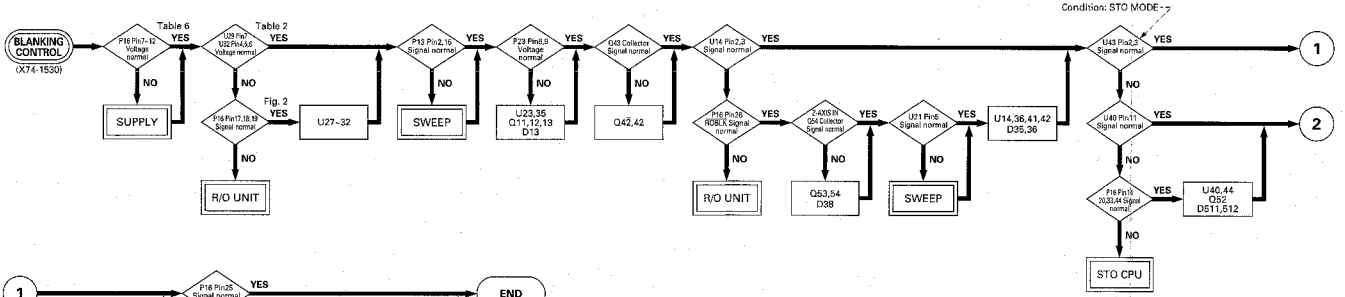
No	HC595	Output Order	Signal Name	Content
06	QA	48	↓XY	H-Mode="XY" THEN "L" ELSE "H"
	QB	47	ASD0	A SWEEP DATA 0
	QC	46	ASD1	A SWEEP DATA 1
	QD	45	ASD2	A SWEEP DATA 2
	QE	44	ASD3	A SWEEP DATA 3
	QF	43	ASDC	A SWEEP DATA C
	QG	42	BSD0	B SWEEP DATA 0
	QH	41	BSD1	B SWEEP DATA 1
05	QA	40	BSD2	B SWEEP DATA 2
	QB	39	BSD3	B SWEEP DATA 3
	QC	38	BSDC	B SWEEP DATA C
	QD	37	↓AC	T-Couple="AC" THEN "L" ELSE "H"
	QE	36	↓HFLN	T-Couple="HFrej" OR A-T-Source="LINE" THEN "L" ELSE "H"
	QF	35	↓TSLP	T-Couple="TV-+" AND SLOPE="-" THEN "L" ELSE "H"
	QG	34	EXT	MODE = "LINE"&TRIG" THEN "L" ELSE (EXT TRIG) THEN "H"
	QH	33	NULL	"L"
04	QA	32	↓FIX	T-Mode="FIX" THEN "L" ELSE "H"
	QB	31	LINE	A-T-Source="LINE" OR "EXT" THEN "H" ELSE "L"
	QC	30	TV	T-Couple="TV-+" THEN "H" ELSE "L"
	QD	29	↓SLP+	T-Couple="AC,HFrej,DC" AND SLOPE="+" THEN "L" ELSE "H"
	QE	28	↓SLP-	T-Couple="AC,HFrej,DC" AND SLOPE="-" THEN "L" ELSE "H"
	QF	27	↓NORM	T-Mode="NORM" OR "SINGLE" THEN "L" ELSE "H"
	QG	26	↓AFTD	B-Trig-Source="AFTER DELAY" THEN "L" ELSE "H"
	QH	25	STO	SCOPE-mode="STORAGE" THEN "H" ELSE "L"
03	QA	24	↓TVL	T-Couple="TV-L" THEN "L" ELSE "H"
	QB	23	XYSGL	H-Mode="XY" AND single-trace THEN "H" ELSE "L"
	QC	22	TCD0	Trig Counter DATA LSB
	QD	21	TCD1	Trig Counter DATA
	QE	20	TCD2	Trig Counter DATA
	QF	19	TCD3	Trig Counter DATA
	QG	18	TCD4	Trig Counter DATA
	QH	17	TCD5	Trig Counter DATA
02	QA	16	TCD6	Trig Counter DATA
	QB	15	TCD7	Trig Counter DATA
	QC	14	TCD8	Trig Counter DATA
	QD	13	TCD9	Trig Counter DATA
	QE	12	TCD10	Trig Counter DATA MSB
	QF	11	TCF	B-T-Source="COUNT" THEN "L" ELSE "H"
	QG	10	↓SGL	T-Mode="SINGLE" OR Storage-Mode="EQU" THEN "L" ELSE "H"
	QH	9	↓CHOP	V-Mode="CHOP" THEN "L" ELSE "H"
01	QA	8	↓TVA	T-Couple="TV-" THEN "L" ELSE "H"
	QB	7	↓TRGD	B-T-Source="TRIG'D" or "COUNT" THEN "L" ELSE "H"
	QC	6	EQU	Storage-Mode="EQU" THEN "L" ELSE "H"
	QD	5	↓MAG	H-MAG="ON" THEN "L" ELSE "H"
	QE	4	↓A	H-Mode="A" OR "XY" THEN "L" ELSE "H"
	QF	3	↓B	H-Mode="B" THEN "L" ELSE "H"
	QG	2	ALT+B	H-Mode="ALT" OR "B" THEN "H" ELSE "L"
	QH	1	↓ALT	H-Mode="ALT" THEN "H" ELSE "L"

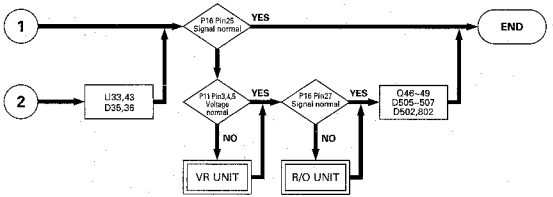
↓ : Indicates the negative logic data.

Table 2 Serial Transfer

TROUBLESHOOTING



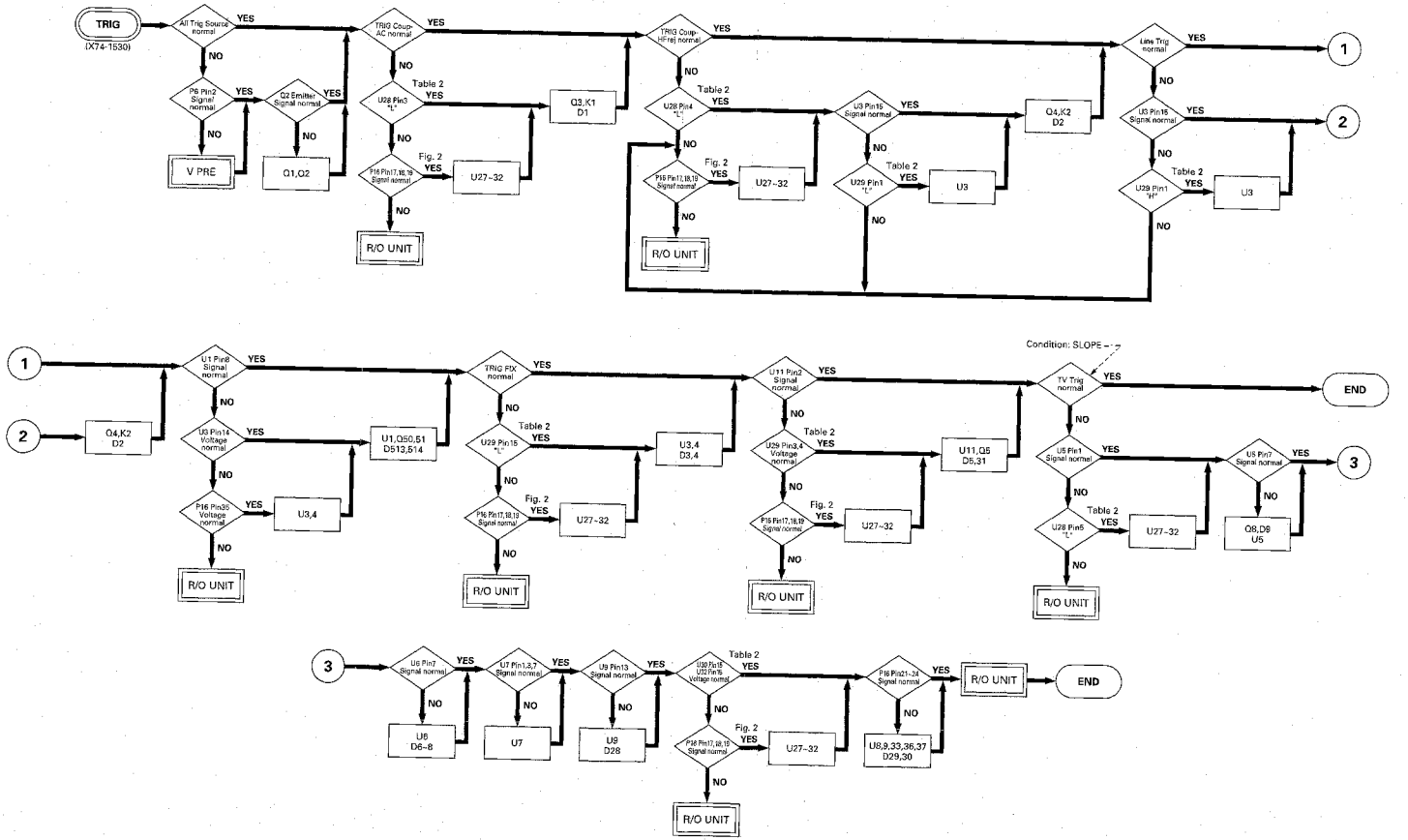




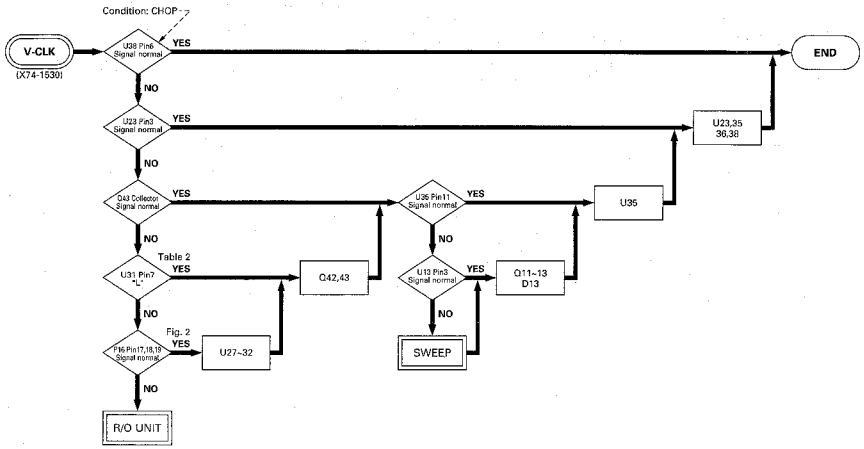
P16 Pin No.	Voltage [V]
7	-10
8	-10
9	+10
10	+10
11	+5
12	+5

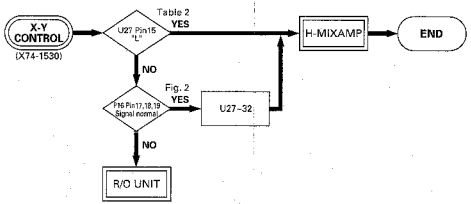
Table 6 Voltage

TROUBLESHOOTING

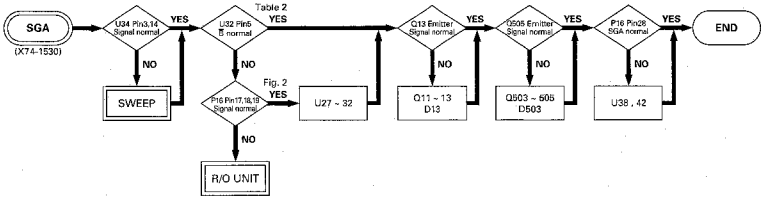


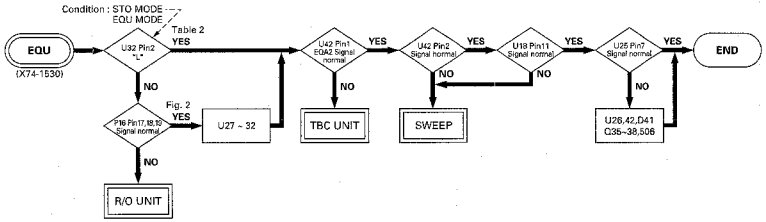
TROUBLESHOOTING

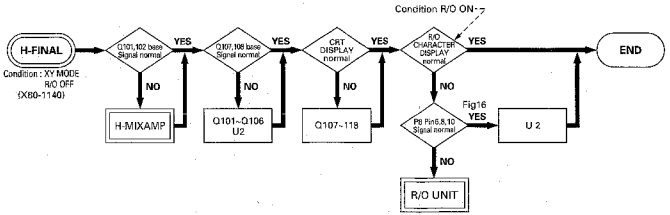




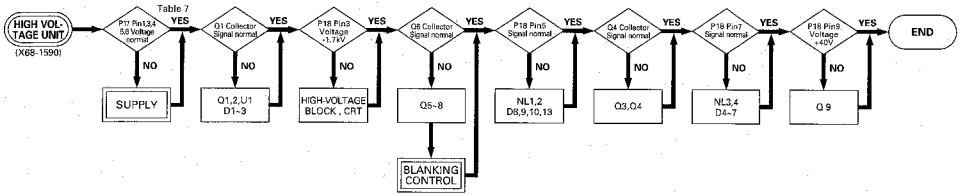
TROUBLESHOOTING

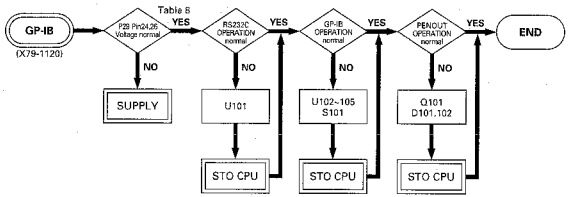


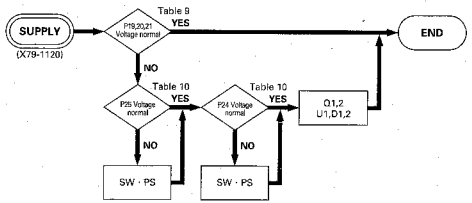




TROUBLESHOOTING







P17 Pin No.	Voltage [V]
1	+140
3	+12
4	-12
5	+10
6	-10

Table 7 Voltage

P29 Pin No.	Voltage [V]
24	+5
26	+5

Table 8 Voltage

P No.	Pin No.	Voltage [V]
19	2	+12
19	3	+12
19	4	+10
19	5	+10
19	6	+10
19	8	-12
19	9	-12
19	10	-10
19	11	-10
19	12	-10
20	2	-5
20	3	-5
20	4	-5
20	5	-5
20	7	+5
20	8	+5
20	9	+5
20	10	+5
21	4	+60
21	6	+140

Table 9 Voltage

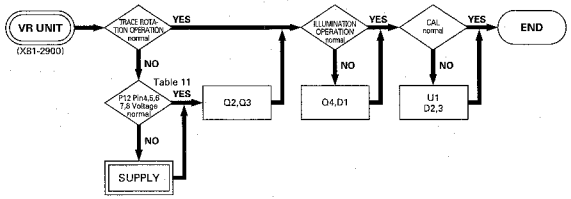
P No.	Pin No.	Voltage [V]
24	2	+12
24	3	+12
24	4	+12
24	6	-12
24	7	-12
24	8	-12
24	11	+60
24	13	+140
25	2	-5
25	3	-5
25	4	-5
25	5	-5
25	7	+5
25	8	+5
25	9	+5
25	10	+5

Table 10 Voltage

P12 Pin No.	Voltage [V]
4	+140
5	+10
6	-10
7	+12
8	+12

Table 11 Voltage

TROUBLESHOOTING

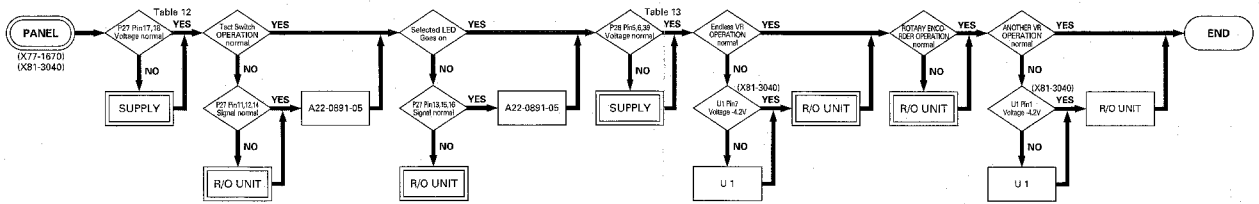


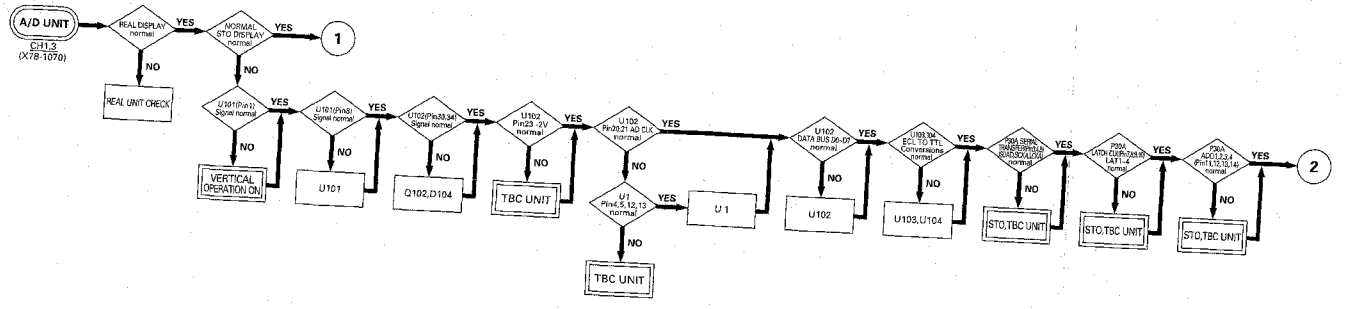
P27 Pin No.	Voltage [V]
17	+5
18	+5

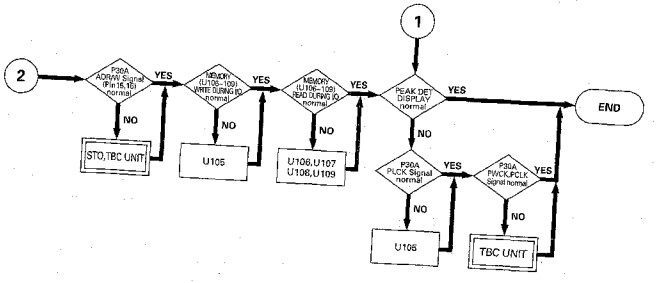
Table 12 Voltage

P28 Pin No.	Voltage [V]
5	+10
6	-10
39	+5

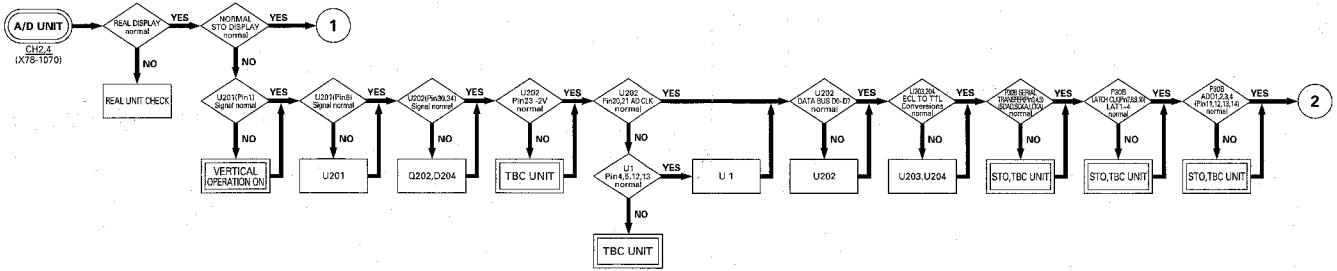
Table 13 Voltage

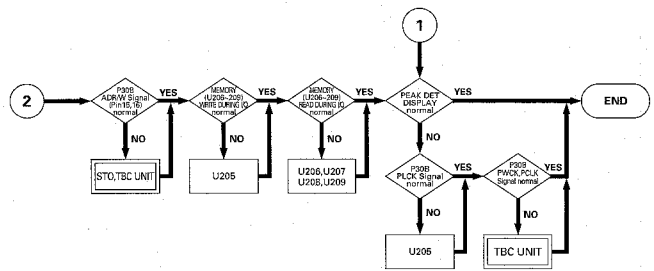



A/D UNIT
CH1,3
(X78-1070)
REAL DISPLAY normal
YES
NO
REAL UNIT CHECK
NORMAL STO DISPLAY normal
YES
NO
1
U101(Pin11) Signal normal
YES
NO
VERTICAL OPERATION ON
U101(Pin9) Signal normal
YES
NO
U101
U102(Pin33,34) Signal normal
YES
NO
Q102,D104
U102 Pin23 -2V normal
YES
NO
TBC UNIT
U102 Pin20,21 AD CLK normal
YES
NO
U1 Pin4,5,12,13 normal
YES
NO
U1
TBC UNIT
U102 DATA BUS D0-D7 normal
YES
NO
U102
U103,104 ECL TO TTL Conversions normal
YES
NO
U103,U104
P30A SERIAL TRANSFER(LD,SCK,SDO,LOAD) normal
YES
NO
STO,TBC UNIT
P30A LATCH CLK(Pin7,23,9) LAT1~4 normal
YES
NO
STO,TBC UNIT
P30A ADD1,2,3,4 (Pin11,12,13,14) normal
YES
NO
STO,TBC UNIT
2


2
P30A AD/RW Signal (Pin15,16) normal
YES
NO
STO,TBC UNIT
MEMORY (U106~109) WRITE TIMING (R) normal
YES
NO
U105
MEMORY (U106~109) READ TIMING (R) normal
YES
NO
U106,U107 U108,U109
1
PEAK DET DISPLAY normal
YES
NO
END
P30A PLCK Signal normal
YES
NO
U106
P30A PWCK,PCLK Signal normal
YES
NO
TBC UNIT

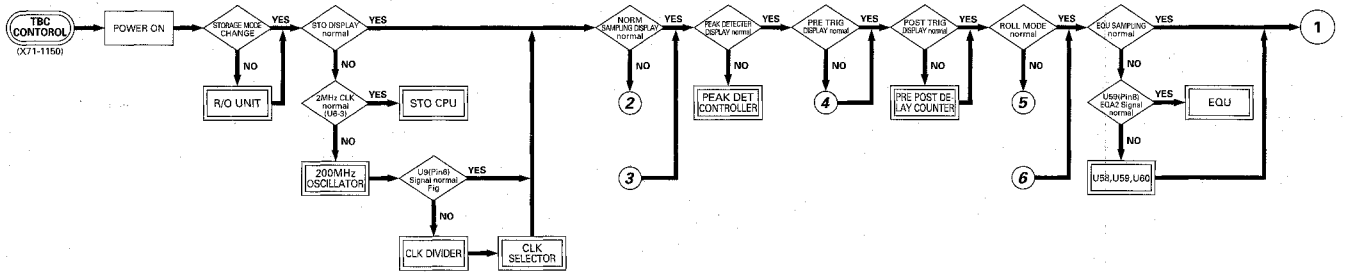
TROUBLESHOOTING

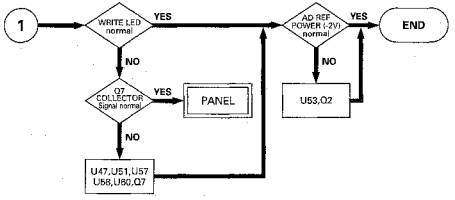


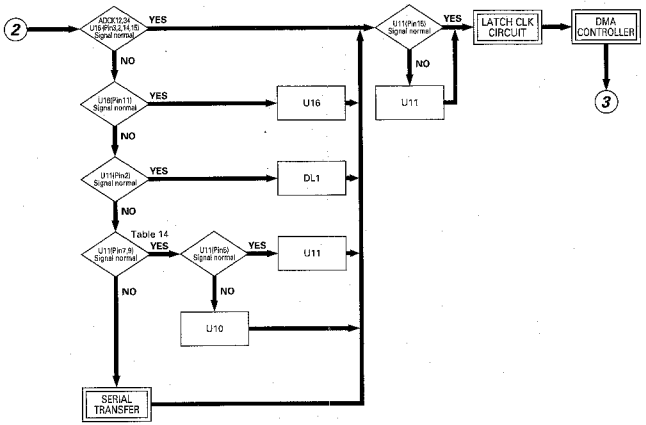


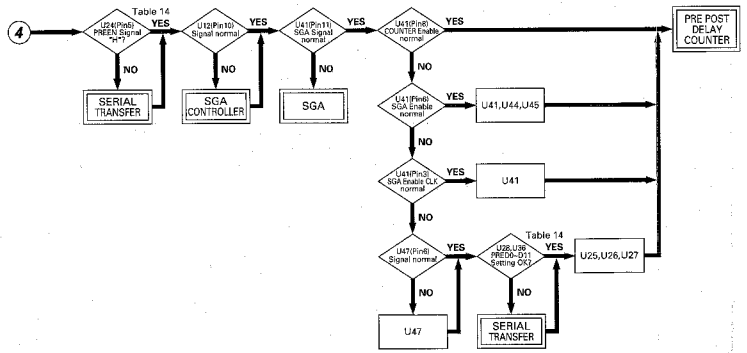
TROUBLESHOOTING

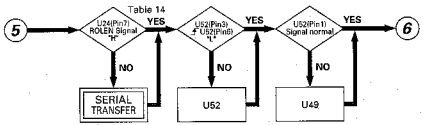
TIME BASE UNIT TROUBLESHOOTING



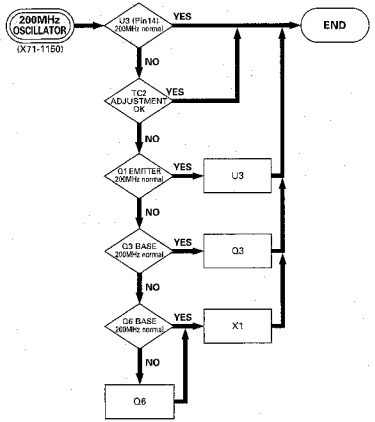


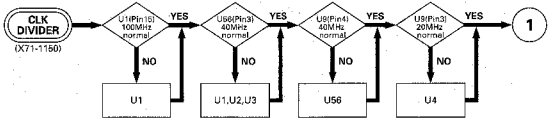

2
XDCK(12,24)
U16(Pin2,3,4,15)
Signal normal
YES
NO
U11(Pin15)
Signal normal
YES
NO
LATCH CLK CIRCUIT
DMA CONTROLLER
3
U16(Pin11)
Signal normal
YES
U16
U11
NO
U11(Pin2)
Signal normal
YES
DL1
NO
Table 14
U11(Pin7,9)
Signal normal
YES
U11(Pin5)
Signal normal
YES
U11
NO
NO
U10
SERIAL TRANSFER

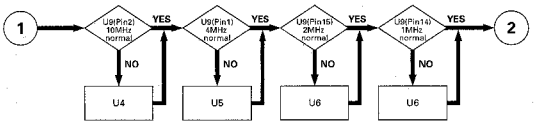

4
Table 14
U24(Pin5)
PREEN Signal
"H"?
YES
NO
SERIAL TRANSFER
U12(Pin10)
Signal normal
YES
NO
SGA CONTROLLER
U41(Pin11)
SGA Signal
normal
YES
NO
SGA
U41(Pin6)
COUNTER Enable
normal
YES
NO
PRE POST DELAY COUNTER
U41(Pin8)
SGA Enable
normal
YES
U41,U44,U45
NO
U41(Pin3)
SGA Enable CLK
normal
YES
U41
NO
U47(Pin6)
Signal normal
YES
NO
U47
Table 14
U26,U36
PREDO-D11
Setting OK?
YES
NO
SERIAL TRANSFER
U25,U26,U27

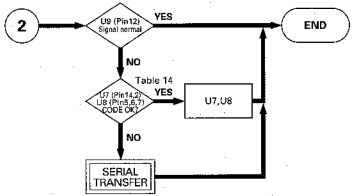

5
Table 14
U24(Pin7)
ROLEN Signal
"H"
YES
NO
SERIAL TRANSFER
U52(Pin3)
"L"
YES
NO
U52
U52(Pin1)
Signal normal
YES
NO
U49
6

TROUBLESHOOTING









U23	HC595	Output Order	Signal Name	Content
	QA	72	FMD0	FAST MEMORY ADDRESS DATA D0
	QB	71	FMD1	FAST MEMORY ADDRESS DATA D1
	QC	70	FMD2	FAST MEMORY ADDRESS DATA D2
	QD	69	FMD3	FAST MEMORY ADDRESS DATA D3
	QE	68	FMD4	FAST MEMORY ADDRESS DATA D4
	QF	67	FMD5	FAST MEMORY ADDRESS DATA D5
	QG	66	FMD6	FAST MEMORY ADDRESS DATA D6
	QH	65	FMD7	FAST MEMORY ADDRESS DATA D7

U24	HC595	Output Order	Signal Name	Content
	QA	64	FMD8	FAST MEMORY ADDRESS DATA D8
	QB	63	FMD9	FAST MEMORY ADDRESS DATA D9
	QC	62	FMD10	FAST MEMORY ADDRESS DATA D10
	QD	61	FMD11	FAST MEMORY ADDRESS DATA D11
	QE	60	MESEL	2k Mem. for NOR or POST operation. "H" when divided, "L" in other case.
	QF	59	PREEN	"H" during PRE TRIG, "L" in other case.
	QG	58	PSTEN	"H" during POST TRIG, "L" in other case.
	QH	57	ROLEN	"H" during ROLL MODE, "L" in other case.

U28	HC595	Output Order	Signal Name	Content
	QA	56	PRED0	PRE TRIG SCA ENABLE COUNT DATA D0
	QB	55	PRED1	PRE TRIG SCA ENABLE COUNT DATA D1
	QC	54	PRED2	PRE TRIG SCA ENABLE COUNT DATA D2
	QD	53	PRED3	PRE TRIG SCA ENABLE COUNT DATA D3
	QE	52	PRED4	PRE TRIG SCA ENABLE COUNT DATA D4
	QF	51	PRED5	PRE TRIG SCA ENABLE COUNT DATA D5
	QG	50	PRED6	PRE TRIG SCA ENABLE COUNT DATA D6
	QH	49	PRED7	PRE TRIG SCA ENABLE COUNT DATA D7

TIME BASE UNIT				
U34	HC595	Output Order	Signal Name	Content
	QA	48	DLYD0	PRE&POST TRIG DELAY COUNT DATA D0
	QB	47	DLYD1	PRE&POST TRIG DELAY COUNT DATA D1
	QC	46	DLYD2	PRE&POST TRIG DELAY COUNT DATA D2
	QD	45	DLYD3	PRE&POST TRIG DELAY COUNT DATA D3
	QE	44	DLYD4	PRE&POST TRIG DELAY COUNT DATA D4
	QF	43	DLYD5	PRE&POST TRIG DELAY COUNT DATA D5
	QG	42	DLYD6	PRE&POST TRIG DELAY COUNT DATA D6
	QH	41	DLYD7	PRE&POST TRIG DELAY COUNT DATA D7

U35	HC595	Output Order	Signal Name	
	QA	40	DLYD8	PRE&POST TRIG DELAY COUNT DATA D8
	QB	39	DLYD9	PRE&POST TRIG DELAY COUNT DATA D9
	QC	38	DLYD10	PRE&POST TRIG DELAY COUNT DATA D10
	QD	37	DLYD11	PRE&POST TRIG DELAY COUNT DATA D11
	QE	36	DLYD12	PRE&POST TRIG DELAY COUNT DATA D12
	QF	35	DLYD13	PRE&POST TRIG DELAY COUNT DATA D13
	QG	34	DLYD14	PRE&POST TRIG DELAY COUNT DATA D14
	QH	33	DLYD15	PRE&POST TRIG DELAY COUNT DATA D15

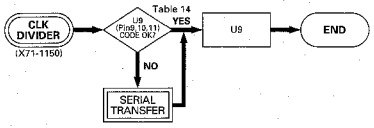
U36	HC595	Output Order	Signal Name	
	QA	32	DLYD16	PRE&POST TRIG DELAY COUNT DATA D16
	QB	31	DLYD17	PRE&POST TRIG DELAY COUNT DATA D17
	QC	30	DLYD18	PRE&POST TRIG DELAY COUNT DATA D18
	QD	29	DLYD19	PRE&POST TRIG DELAY COUNT DATA D19
	QE	28	PRED8	PRE TRIG SCA ENABLE COUNT DATA D8
	QF	27	PRED9	PRE TRIG SCA ENABLE COUNT DATA D9
	QG	26	PRED10	PRE TRIG SCA ENABLE COUNT DATA D10
	QH	25	PRED11	PRE TRIG SCA ENABLE COUNT DATA D11

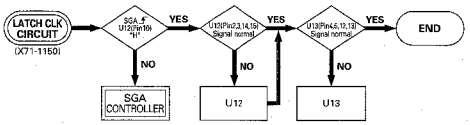
U17	HC595	Output Order	Signal Name	
	QA	24	*	Always "L".
	QB	23	*	Always "L".
	QC	22	*	Always "L".
	QD	21	*	Always "L".
	QE	20	*	Always "L".
	QF	19	*	Always "L".
	QG	18	TBCD9	TIME BASE CODE D9
	QH	17	TBCD8	TIME BASE CODE D8

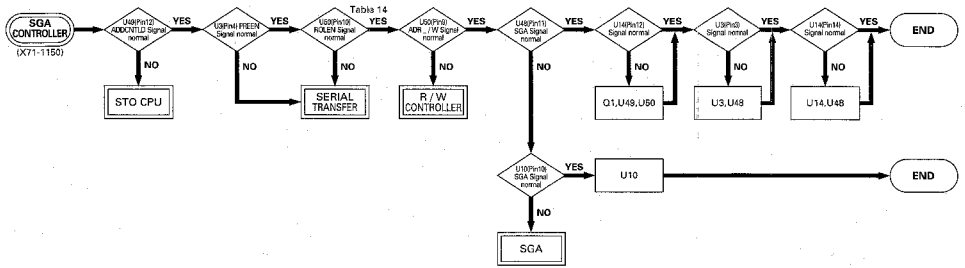
U15	HC595	Output Order	Signal Name	
	QA	16	TBCD7	TIME BASE CODE D7
	QB	15	TBCD6	TIME BASE CODE D6
	QC	14	TBCD5	TIME BASE CODE D5
	QD	13	TBCD4	TIME BASE CODE D4
	QE	12	TBCD3	TIME BASE CODE D3
	QF	11	TBCD2	TIME BASE CODE D2
	QG	10	TBCD1	TIME BASE CODE D1
	QH	9	TBCD0	TIME BASE CODE D0

A/D UNIT				
	HC595	Output Order	Signal Name	Content
	QA	8	*	Always "L".
	QB	7	*	Always "L".
	QC	6	*	Always "L".
	QD	5	*	Always "L".
	QE	4	PKOUT	"H" when PEAK DET is ON, "L" in other cases.
	QF	3	PKA	"L" MIN/ "L" MAX / "H" MIN / "H" OFF
	QG	2	PKB	"L"/MAX/ "H" / "L" / "H"
	QH	1	PKDEN	"L" when PEAK DET is ON, "H" in other case.

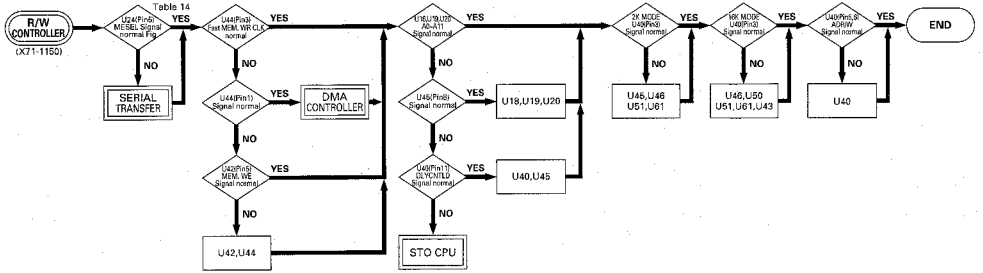
Table 1 Serial Transfer

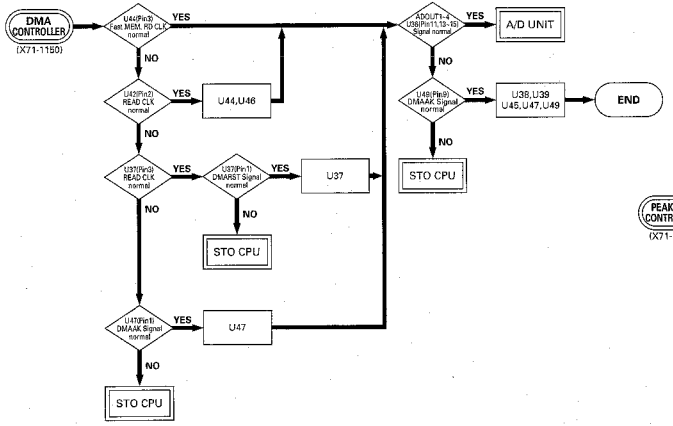

CLK DIVIDER
(X71-1150)
Table 14
U9 (Pin9, 10, 11) CODE: DA7
YES
NO
U9
END
SERIAL TRANSFER

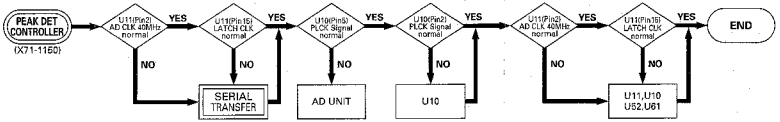

LATCH CLK CIRCUIT
(X71-1150)
SGA, U12(Pin19) "H"
YES
NO
U13(Pin2,3,14,15) Signal normal
YES
NO
U13(Pin4,5,12,13) Signal normal
YES
NO
END
SGA CONTROLLER
U12
U13


SGA CONTROLLER
(X71-1150)
Table 14
U49(Pin12) ADDCNTLD Signal normal
YES
NO
U3(Pin6) FREEN Signal normal
YES
NO
U9(Pin19) ROLBEN Signal normal
YES
NO
U50(Pin9) ADR. . / W Signal normal
YES
NO
U48(Pin11) SGA Signal normal
YES
NO
U14(Pin12) Signal normal
YES
NO
U3(Pin2) Signal normal
YES
NO
U14(Pin14) Signal normal
YES
NO
END
STO CPU
SERIAL TRANSFER
R / W CONTROLLER
Q1,U49,U50
U3,U49
U14,U48
U10(Pin19) SGA Signal normal
YES
NO
U10
END
SGA

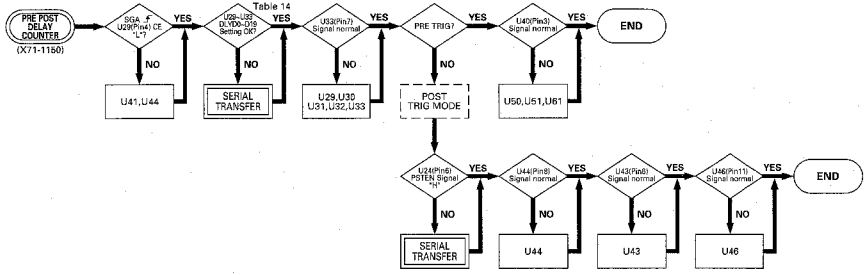
TROUBLESHOOTING

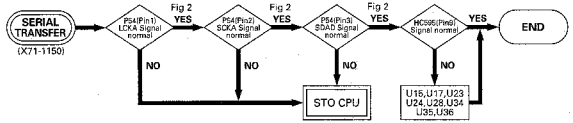




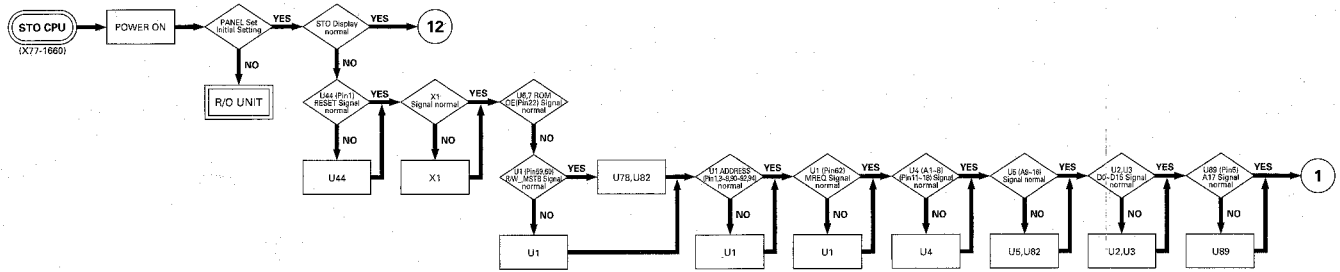


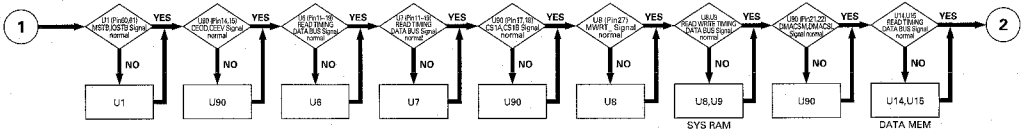
TROUBLESHOOTING

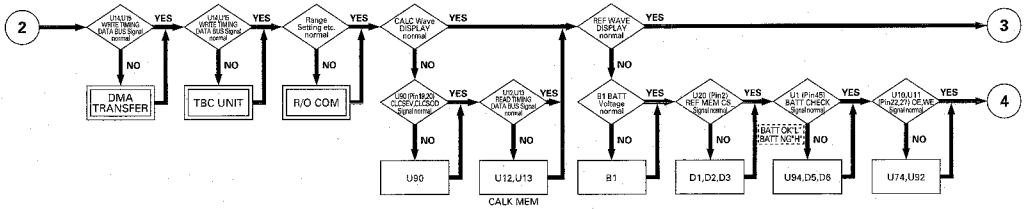




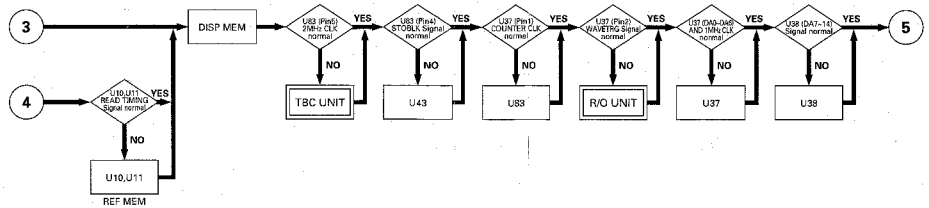
TROUBLESHOOTING

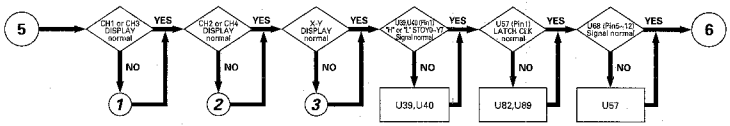


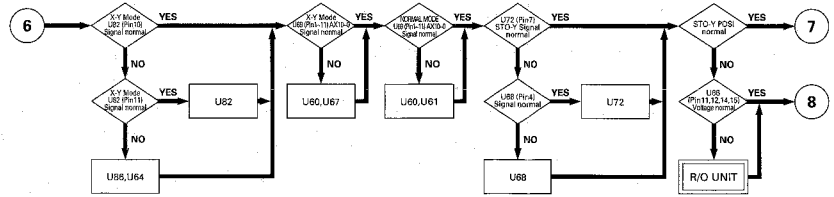


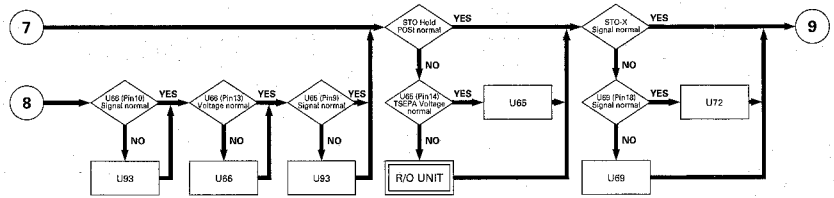


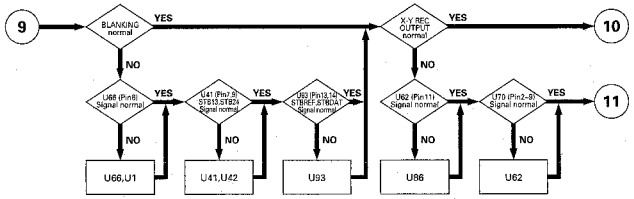
TROUBLESHOOTING

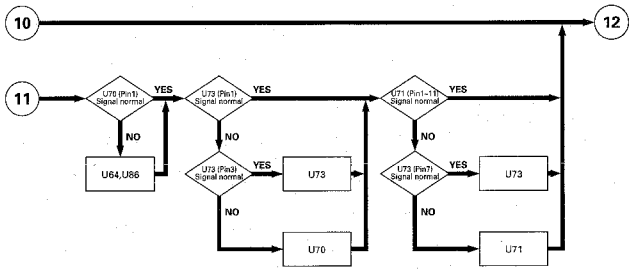


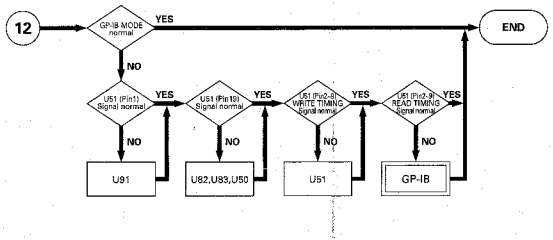




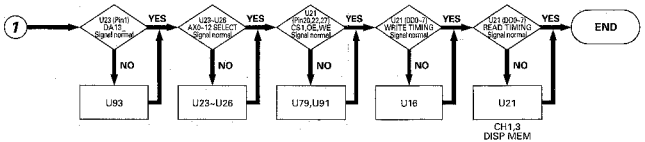

7
8
9
STO Hold POSI normal
YES
NO
STO-X Signal normal
YES
NO
U66 (Pin10) Signal normal
YES
NO
U93
U66 (Pin13) Voltage normal
YES
NO
U66
U65 (Pin9) Signal normal
YES
NO
U93
U65 (Pin14) TSCPA Voltage normal
YES
NO
R/O UNIT
U65
U69 (Pin18) Signal normal
YES
NO
U69
U72

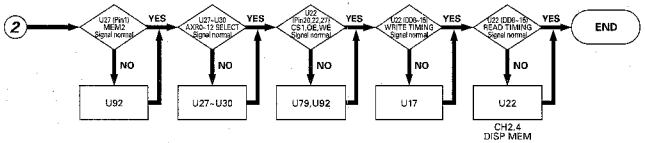

9
10
11
BLANKING normal
YES
NO
U68 (Pin8) Signal normal
YES
NO
U66,U1
U41 (Pin7,9) STB13,STB14 Signal normal
YES
NO
U41,U42
U93 (Pin13,12) STB15,STB16 Signal normal
YES
NO
U93
X-Y REC OUTPUT normal
YES
NO
U62 (Pin11) Signal normal
YES
NO
U86
U70 (Pin2~9) Signal normal
YES
NO
U62

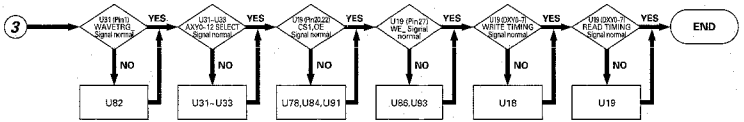

10
11
12
U70 (Pin1) Signal normal
YES
NO
U64,U86
U73 (Pin1) Signal normal
YES
NO
U73 (Pin3) Signal normal
YES
NO
U73
U70
U71 (Pin1~11) Signal normal
YES
NO
U73 (Pin7) Signal normal
YES
NO
U73
U71


12
GP-IB MODE normal
YES
NO
U51 (Pin1) Signal normal
YES
NO
U91
U51 (Pin10) Signal normal
YES
NO
U82,U83,U50
U1 (Pin2-3) WRITE TIMING Signal normal
YES
NO
U51
U1 (Pin2-3) READ TIMING Signal normal
YES
NO
GP-IB
END

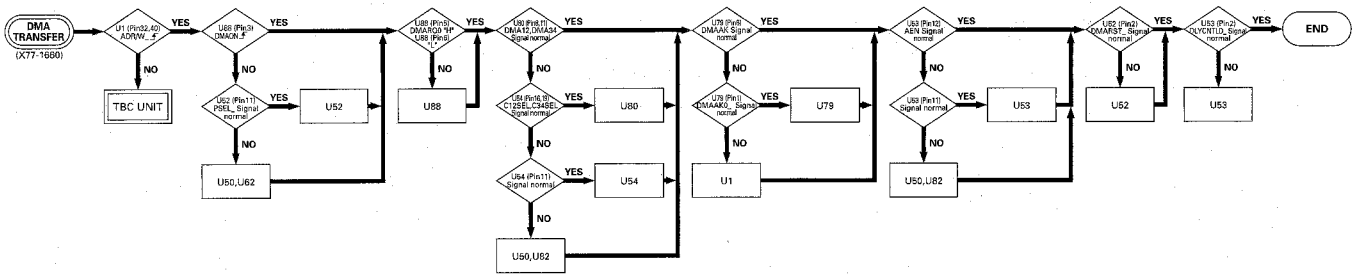
TROUBLESHOOTING

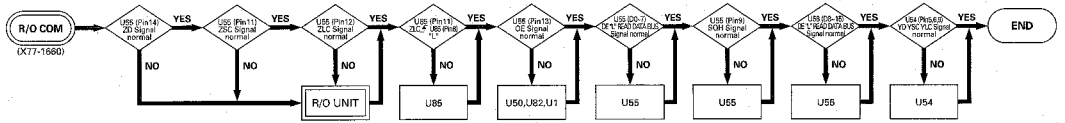






TROUBLESHOOTING





TROUBLESHOOTING

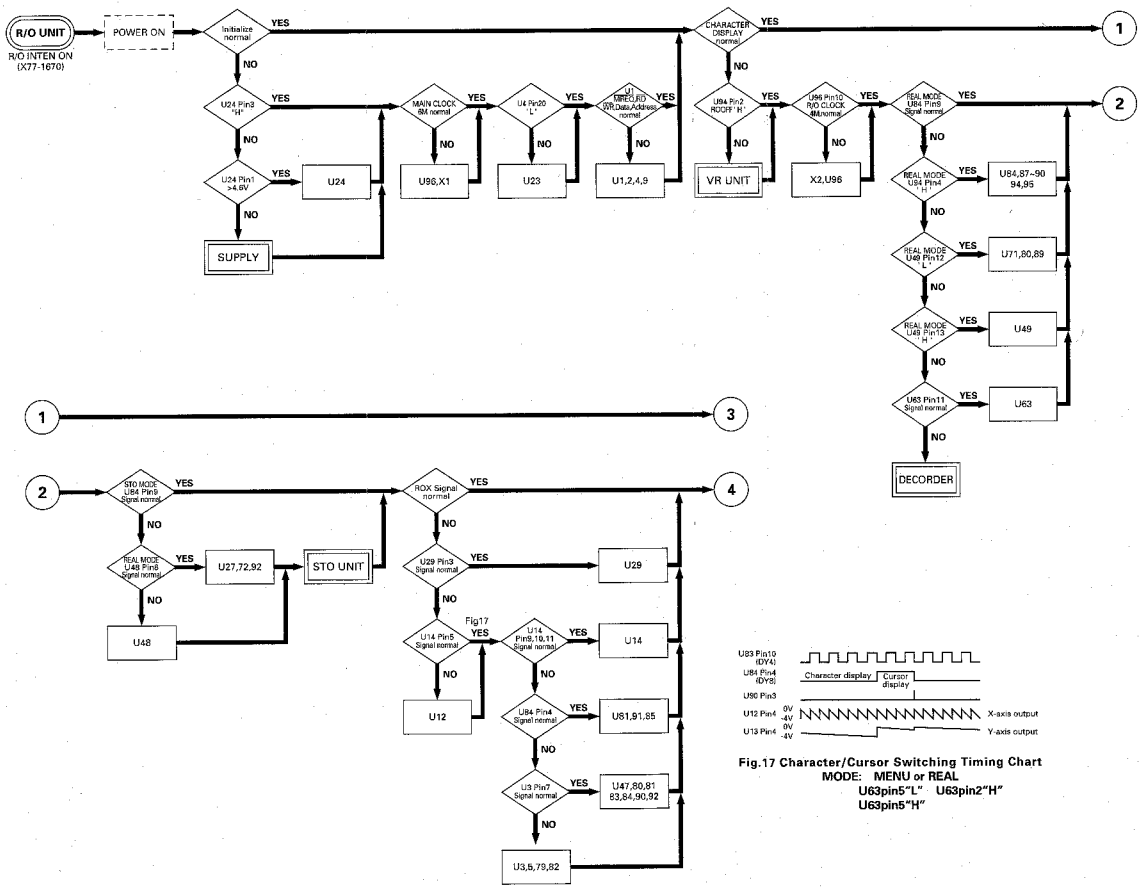
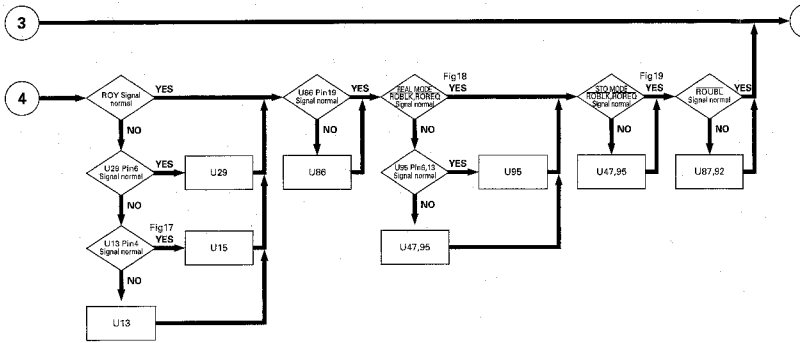


Fig.17 Character/Cursor Switching Timing Chart
MODE: MENU or REAL
U63pin5"L" U63pin2"H"
U63pin5"H"

TROUBLESHOOTING



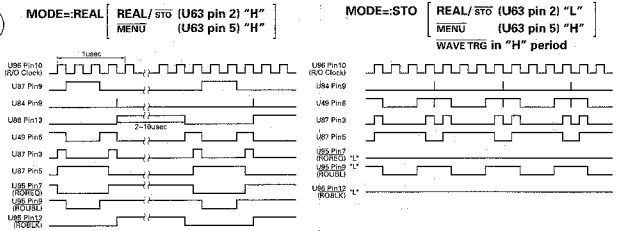
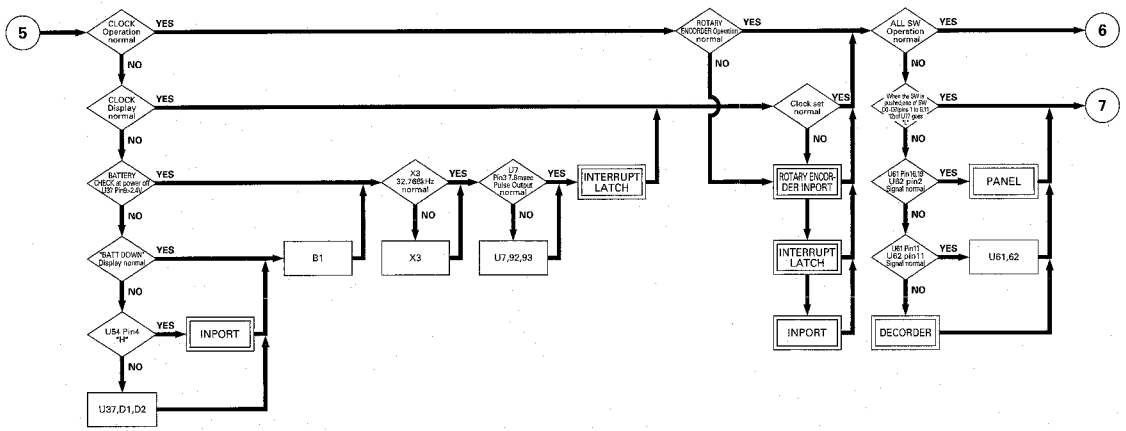
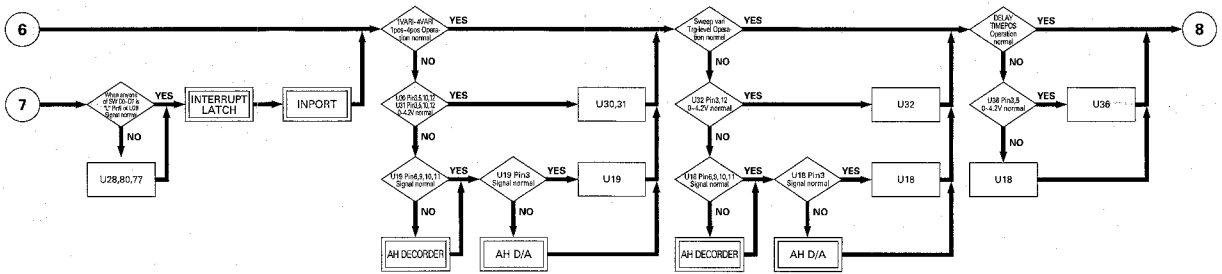


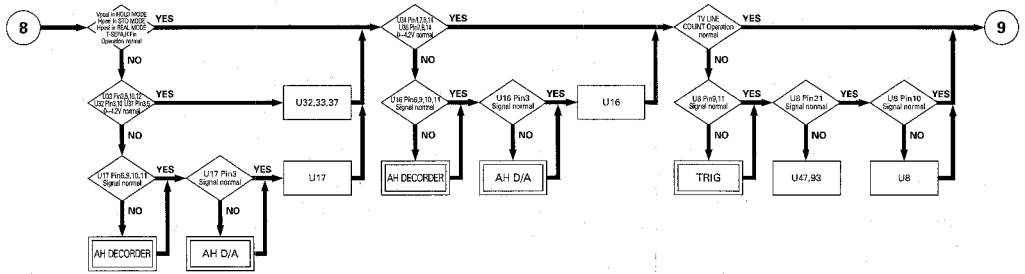
Fig.18 Fig.19

ROUBL, ROREQ and ROBLK Signal Timing Chart

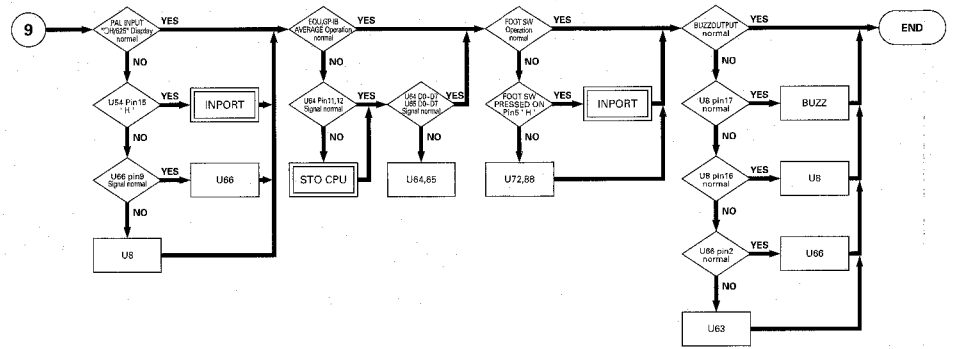


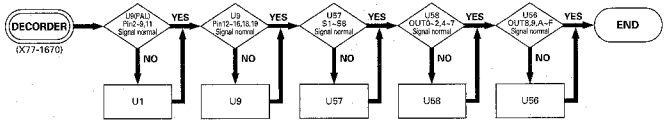
TROUBLESHOOTING

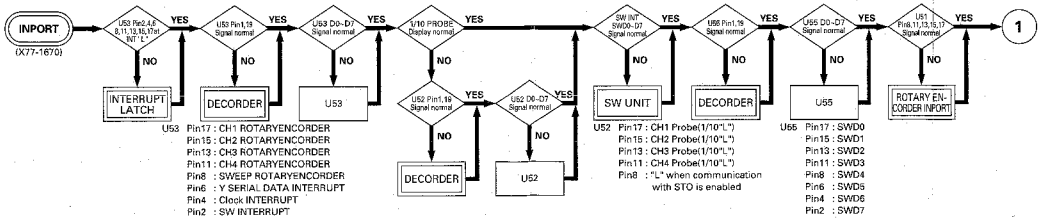




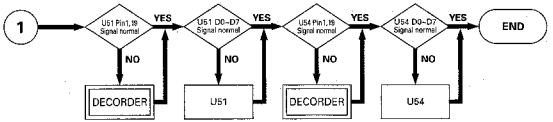
TROUBLESHOOTING





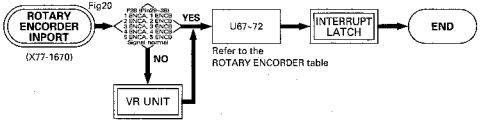


TROUBLESHOOTING



U51 Pin17 : CH1 ENC-
Pin15 : CH2 ENC-
Pin13 : CH3 ENC-
Pin11 : CH4 ENC-

U54 Pin17 : FUTSW ON "H"
Pin15 : PAL "H"
Pin13 : P/A > ANALOG INPUT "H"
Pin11 : READY status "L"
Pin8 : "L" when analog hold write is enabled
Pin6 : "L" with interlaced video
Pin4 : "H" when BATT is down
Pin2 : "L" when ZLC output is enabled



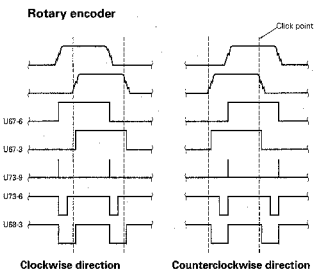
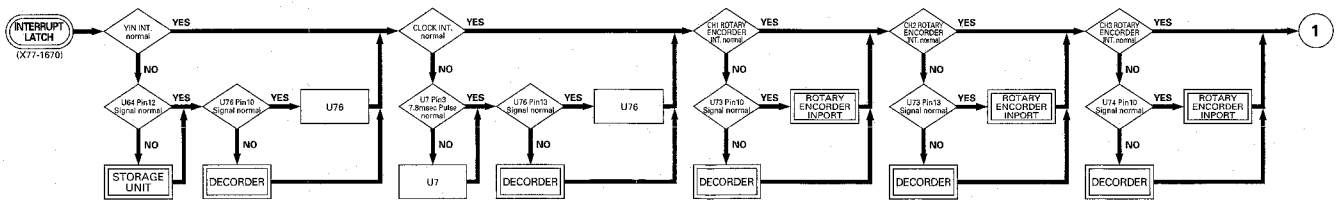
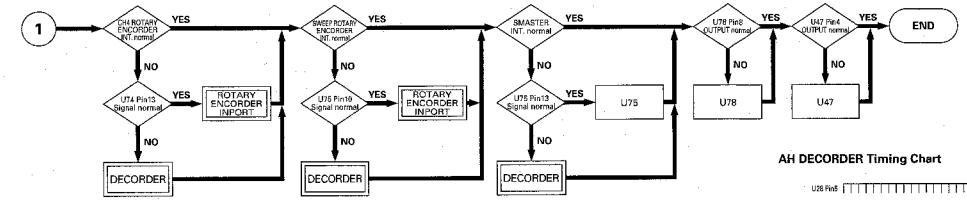
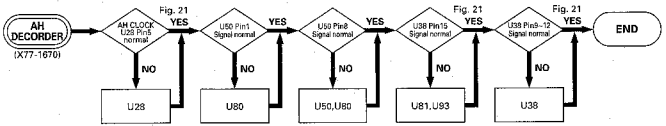


Fig.20



TROUBLESHOOTING





AH DECORDER Timing Chart

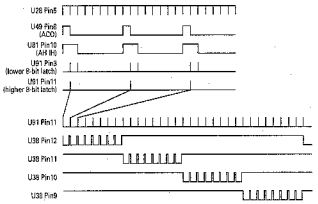
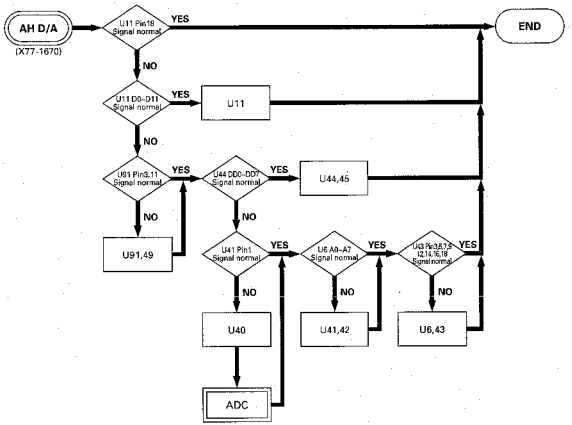
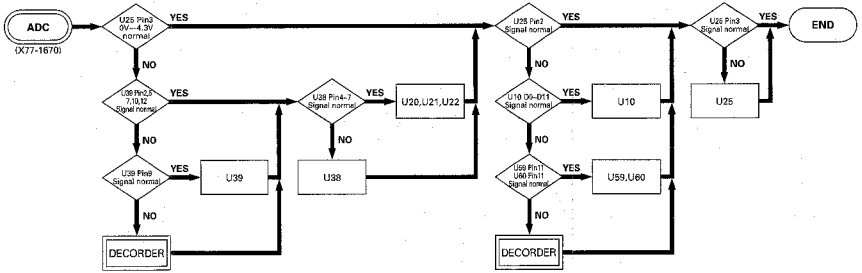


Fig.21





PARTS LIST

DCS-9100 UNIT

Y70-1710-01

REF.NO	PARTS NO	NAME & DESCRIPTION
	B30-0825-05	LAMP
	B41-0710-14	CAUTION LABEL,HIGH VOLTAGE
	B41-2032-04	SERIAL NO.PLATE
	B42-3819-05	SERIAL NO.PLATE
	B62-0102-10	INSTRUCTION MANUAL;JAPANESE
	B63-0103-10	INSTRUCTION MANUAL;ENGLISH
	C91-2575-08	CAPACITOR AC250V 0.22UF
	E30-1819-15	CEE POWER CORD SET
	E30-1829-05	BS POWER CORD
	E30-1950-05	JIS POWER CORD
	E30-1951-05	UL/CSA POWER CORD
	E30-1953-05	SAA POWER CORD
	E38-0454-05	WIRE ASS'Y:P6
	E38-0455-05	WIRE ASS'Y:P11
	E38-0456-05	WIRE ASS'Y:P12
	E38-0457-05	WIRE ASS'Y:P22
	E38-0458-05	WIRE ASS'Y:P23
	E38-0459-05	WIRE ASS'Y:P24
	E38-0460-05	WIRE ASS'Y:P25
	E38-0461-15	WIRE ASS'Y:P27
	E38-0462-15	WIRE ASS'Y:P28
	E38-0463-05	WIRE ASS'Y:P103
	E38-0464-05	WIRE ASS'Y
	E38-0472-05	WIRE ASS'Y:CAL
	E38-0673-05	WIRE ASS'Y:A/D TO CHD
	E38-0690-06	WIRE ASS'Y:P1 TO P3
	F05-5025-05	FUSE(5X20MM) T5A/250V
	F20-0897-04	INSULATOR
	F51-0050-05	FUSE(6.3X32MM) T5A/250V
	H10-3901-02	FOAMED STYRENE PAD,FRONT
	H10-3902-12	FOAMED STYRENE PAD,REAR
	H20-1727-04	VINYL COVER
	H52-0326-04	CARTON BOX
	N15-1026-41	WASHER M2.6
	N19-0710-05	WASHER,DIECAST
	N03-2301-15	P/O PROBE, PC-31
i	A01-1252-02	CASE,TOP
1	A01-1253-02	CASE,BOTTOM
3	A10-1475-01	CHASSIS
4	A10-1484-08	CHASSIS,FOR SWITCHING PS UNIT
5	A11-0506-03	CHASSIS,FOR UNIT
6	A13-0928-13	FRAME
7	A13-0979-01	FRAME,RIGHT
8	A13-0980-01	FRAME,LEFT
9	A13-0981-01	FRAME,CENTER
10	A21-1192-13	DECORATIVE PANEL
11	A63-0056-01	MOLDED PANEL
12	A63-0066-08	SUB PANEL
13	A63-0037-01	REAR PANEL
14	B11-0504-14	FILTER
15	B30-0979-05	LAMP ASS'Y:SCALE ILLUMINATION
16	B72-0032-01	NAME PLATE;MODEL NO.
17	D10-0505-08	FLEXIBLE WIRE,FOR POWER SWITCH
18	E04-0258-08	BNC RECEPTACLE
19	E18-0351-05	AC INLET
20	E21-0666-04	TERMINAL,CAL
21	E23-0547-04	EARTH
22	F07-0926-04	COVER,HANDLE LATCH
23	F07-0963-05	FAN GUARD
24	F07-0985-08	COVER;FOR SWITCHING PS UNIT
25	F11-1210-02	SHIELD,CRT;REAR
26	F11-1251-22	SHIELD,CRT
27	F16-0733-04	FELT (CRT SHIELD)
28	F20-0706-08	INSULATION SHEET;FOR SUB-PANEL
29	G02-0696-14	SPRING,FOR HANDLE
30	G13-0736-14	RUBBER
31	G13-0738-08	BUFFER PLATE;FOR SUB-PANEL
32	G13-0739-08	RUBBER;FOR SUB-PANEL
33	J02-0649-05	RUBBER FOOT
34	J13-0522-05	FUSE HOLDER BODY
35	J13-0524-05	FUSE HOLDER CAP(6.3X32MM)
36	J13-0525-05	FUSE HOLDER CAP(5X20MM)
37	J19-1656-03	HOLDER;CRT
38	J19-1657-04	WEDGE
39	J21-2206-05	GEAR,FOR HANDLE
40	J21-2907-05	RING,FOR HANDLE
41	J21-4613-04	BRACKET
42	J21-4765-13	BRACKET
43	J21-4766-03	BRACKET FOR P.C.B.
44	J21-4767-04	BRACKET
45	J21-4768-04	BRACKET FOR PANEL UNIT
46	J29-0532-08	HOLDER FOR INLET
47	J32-0354-04	BOSS
48	J32-0357-04	BOSS
49	J32-0367-04	BOSS,FOR POWER SWITCH
50	J58-0403-05	NYLON RIVET (ILLUM.)
51	J61-0521-05	SUPPORT
52	J83-0091-08	ELECTRODE SHEET;FOR SUB-PANEL
53	K01-0528-05	HANDLE,CARRYING
54	K21-0919-04	KNOB;S USED
55	K21-0920-04	KNOB;T USED
56	K21-0921-04	KNOB;E USED

REF.NO	PARTS NO	NAME & DESCRIPTION
57	K23-0814-04	KNOB;11 USED
58	K27-0504-04	BUTTON;POWER
59	K29-0818-08	BUTTON;MENU NEXT,AUTO SET,ETC.
60	K29-0819-08	BUTTON;DATA SAVE,F4,F5,ETC.
61	K29-0820-08	BUTTON;SCOPE MODE,ETC.
62	K29-0821-08	BUTTON;NO PRINTED
63	L30-0533-05	COIL,TRACE ROTATION
64	L76-0118-05	DELAY LINE
65	N14-0637-04	PLATE NUT M3
66	S40-1524-05	PUSH SWITCH;POWER
67	S70-0808-08	VOLTAGE SELECTOR SW
68	T40-0424-08	PIN WITH CONNECTOR
70	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
71	W02-2110-08	PANEL UNIT
72	W02-2178-08	SWITCHING POWER SUPPLY UNIT
73	X68-1590-06	HIGH VOLTAGE UNIT
74	X69-1210-00	CONNECTION UNIT
75	X69-1230-00	CONNECTION UNIT
76	X71-1150-00	TIME BASE UNIT
77	X73-1590-00	VERTICAL UNIT
78	X74-1630-00	HORIZONTAL UNIT
79	X77-1650-01	STD CPU UNIT
80	X77-1670-01	R/O UNIT
81	X78-1670-00	A/D UNIT
82	X79-1120-00	FINAL UNIT
83	X80-1140-00	YR UNIT
84	X81-2900-00	ENCODER UNIT
85	X81-2940-00	ENCODER UNIT
86	150YT31A	CRT

DCS-9120 UNIT

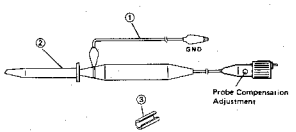
Y70-1710-03

REF.NO	PARTS NO	NAME & DESCRIPTION
	B30-0825-05	LAMP
	B41-0710-14	CAUTION LABEL,HIGH VOLTAGE
	B41-2054-16	SERIAL NO. PLATE
	B42-3819-05	SERIAL NO.PLATE
	B62-0102-10	INSTRUCTION MANUAL;JAPANESE
	B63-0103-10	INSTRUCTION MANUAL;ENGLISH
	C91-2575-08	CAPACITOR AC250V 0.22UF
	E30-1829-05	BS POWER CORD
	E30-1950-05	JIS POWER CORD
	E30-1951-05	UL/CSA POWER CORD
	E30-1952-15	CEE POWER CORD
	E30-1953-05	SAA POWER CORD
	E38-0454-05	WIRE ASS'Y:P6
	E38-0456-05	WIRE ASS'Y:P11
	E38-0457-05	WIRE ASS'Y:P12
	E38-0458-05	WIRE ASS'Y:P22
	E38-0459-05	WIRE ASS'Y:P23
	E38-0460-05	WIRE ASS'Y:P24
	E38-0461-05	WIRE ASS'Y:P25
	E38-0462-05	WIRE ASS'Y:P27
	E38-0463-05	WIRE ASS'Y:P28
	E38-0464-05	WIRE ASS'Y:P103
	E38-0464-05	WIRE ASS'Y
	E38-0472-05	WIRE ASS'Y:CAL
	E38-0673-05	WIRE ASS'Y:A/D TO CHD
	E38-0690-06	WIRE ASS'Y:P1 TO P3
	F05-5025-25	FUSE(5X20MM) T5A/250V
	F20-0897-04	INSULATOR
	F51-0050-05	FUSE(6.3X32MM) T5A/250V
	H10-3901-02	FOAMED STYRENE PAD,FRONT
	H10-3902-12	FOAMED STYRENE PAD,REAR
	H20-1727-04	VINYL COVER
	H52-0326-04	CARTON BOX
	N15-1026-41	WASHER M2.6
	N19-0710-05	WASHER,DIECAST
	N03-2301-15	P/O PROBE, PC-31
1	A01-1252-02	CASE,TOP
2	A01-1253-02	CASE,BOTTOM
3	A10-1475-01	CHASSIS
4	A10-1484-08	CHASSIS;FOR SWITCHING PS UNIT
5	A11-0506-03	CHASSIS,FOR CNIT
6	A13-0928-13	FRAME
7	A13-0979-01	FRAME,RIGHT
8	A13-0980-01	FRAME,LEFT
9	A13-0981-01	FRAME,CENTER
10	A21-1193-13	DECORATIVE PANEL
11	A63-0056-01	MOLDED PANEL
12	A63-0066-08	SUB PANEL
13	A63-0037-01	REAR PANEL
14	B11-0504-14	FILTER
15	B30-0979-05	LAMP ASS'Y:SCALE ILLUMINATION
16	B72-0033-13	NAME PLATE;MODEL NO.
17	D10-0505-05	FLEXIBLE WIRE,FOR POWER SWITCH
18	E04-0258-05	BNC RECEPTACLE
19	E18-0351-05	AC INLET
20	E21-0666-04	TERMINAL,CAL
21	E23-0547-04	EARTH
22	F07-0936-04	COVER,HANDLE LATCH
23	F07-0963-05	FAN GUARD

REF.NO	PARTS NO	NAME & DESCRIPTION
24	F07-0985-08	COVER;FOR SWITCHING PS UNIT
25	F11-1210-03	SHIELD,CRT;REAR
26	F11-1251-22	SHIELD,CRT
27	F16-0733-04	FELT (CRT SHIELD)
28	F20-0706-08	INSULATION SHEET;FOR SUB-PANEL
29	G02-0696-14	SPRING,FOR HANDLE
30	G13-0736-14	RUBBER
31	G13-0738-08	BUFFER PLATE;FOR SUB-PANEL
32	G13-0739-08	RUBBER;FOR SUB-PANEL
33	J02-0649-05	RUBBER FOOT
34	J13-0522-05	FUSE HOLDER BODY
35	J13-0524-05	FUSE HOLDER CAP(6.3X32MM)
36	J13-0525-05	FUSE HOLDER CAP(5X20MM)
37	J19-1656-03	HOLDER;CRT
38	J19-1657-04	WEDGE
39	J21-2906-05	GEAR,FOR HANDLE
40	J21-2907-05	RING,FOR HANDLE
41	J21-4613-04	BRACKET
42	J21-4765-13	BRACKET
43	J21-4766-02	BRACKET FOR P.C.B.
44	J21-4767-04	BRACKET
45	J21-4767-03	BRACKET
46	J21-4768-04	BRACKET FOR PANEL UNIT
47	J29-0532-08	HOLDER FOR INLET
48	J32-0354-04	BOSS
49	J32-0357-04	BOSS
50	J32-0367-04	BOSS,FOR POWER SWITCH
51	J58-0403-05	NYLON RIVET (ILLUM.)
52	J61-0521-05	SUPPORT
53	J83-0091-08	ELECTRODE SHEET;FOR SUB-PANEL
54	K01-0528-05	HANDLE,CARRYING
55	K21-0919-04	KNOB;S USED
56	K21-0920-04	KNOB;T USED
57	K21-0921-04	KNOB;E USED
58	K23-0814-04	KNOB;11 USED
59	K27-0504-04	BUTTON;POWER
60	K29-0818-08	BUTTON;MENU NEXT,AUTO SET,ETC.
61	K29-0819-08	BUTTON;DATA SAVE,F4,F5,ETC.
62	K29-0820-08	BUTTON;SCOPE MODE,ETC.
63	K29-0821-08	BUTTON;NO PRINTED
64	L30-0533-05	COIL,TRACE ROTATION
65	L76-0119-05	DELAY LINE
66	N14-0637-04	PLATE NUT M3
67	S40-1524-05	PUSH SWITCH;POWER
68	S70-0808-08	VOLTAGE SELECTOR SW
69	T40-0424-08	PAK WITH CONNECTOR

REF.NO	PARTS NO	NAME & DESCRIPTION
70	W01-0503-04	REAR RUBBER FOOT/CORD WRAP
71	W02-2110-08	PANEL UNIT
72	W02-2178-08	SWITCHING POWER SUPPLY UNIT
73	X68-1590-00	HIGH VOLTAGE UNIT
74	X69-1210-00	CONNECTION UNIT
75	X69-1230-00	CONNECTION UNIT
76	X71-1150-00	TIME BASE UNIT
77	X73-1590-00	VERTICAL UNIT
78	X74-1630-00	HORIZONTAL UNIT
79	X77-1650-01	STD CPU UNIT
80	X77-1670-03	R/O UNIT
81	X78-1670-00	A/D UNIT
82	X79-1120-00	GP-IB UNIT
83	X80-1140-00	FINAL UNIT
84	X81-2900-00	YR UNIT
85	X81-2940-00	ENCODER UNIT
86	150YT31A	CRT

MODEL PC-31 (LOW CAPACITY PROBE)

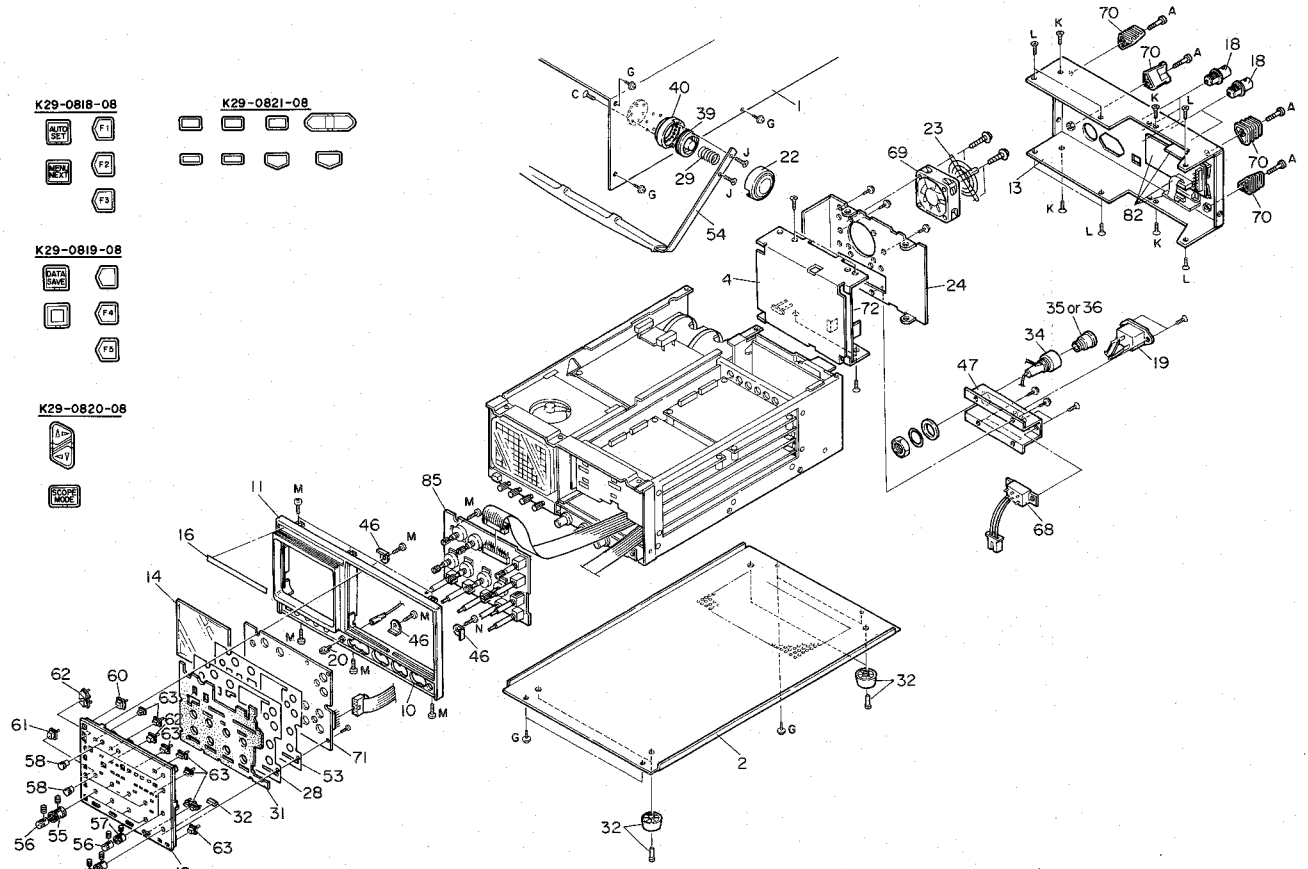


ITEM	DESCRIPTION	PARTS NO.
①	Ground Wire Assembly	E30-1883-08
②	Retractable Hook Tip	E29-0540-08
③	Marker (Orange)	B42-1950-08

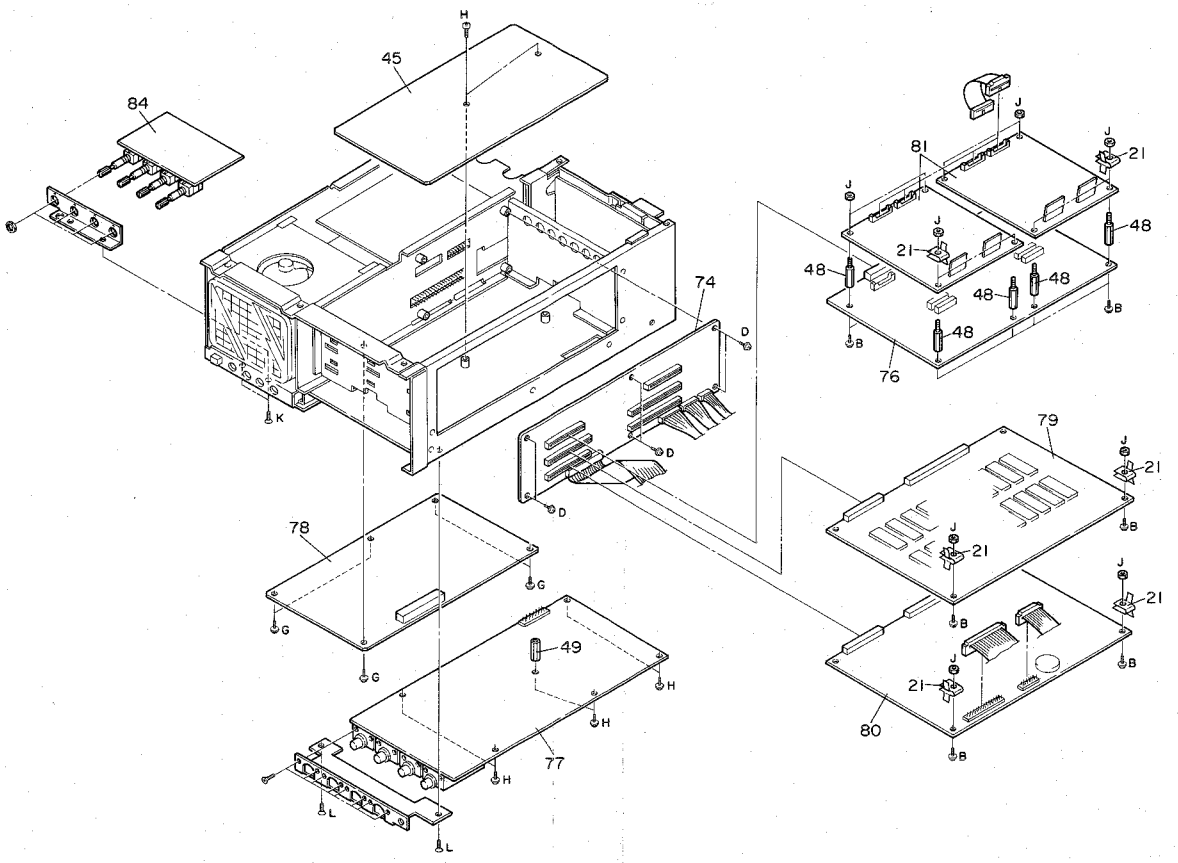
SCREWS

	Parts No.	Parts Name	Figure
A	N08-0611-04	SCREW (FOR CORD WRAP)	
B	N09-0623-04	SCREW, SEMS PAN HD (M3 × 8)	
C	N09-0705-05	SCREW, HEX SOCKET FLAT HD (M4 × 8)	
D	N09-0718-05	SCREW, SEMS PAN HD (M3 × 6)	
E	N09-0731-05	SCREW, SEMS PAN HD (M3 × 12)	
F	N09-0733-05	SCREW, SEMS PAN HD (M3 × 20)	
G	N09-0739-05	SCREW, SEMS BINDING TAPTITE (3 × 8)	
H	N09-0742-04	SCREW, SEMS PAN HD (M3 × 8)	
J	N14-0404-04	FLANGE NUT	
K	N32-3008-41	SCREW, FLAT HD (M3 × 8)	
L	N88-3008-41	SCREW, FLAT HD TAPTITE (3 × 8)	
M	N89-3006-41	SCREW, BINDING TAPTITE (3 × 6)	
N	N89-3008-41	SCREW, BINDING TAPTITE (3 × 8)	

DISASSEMBLY

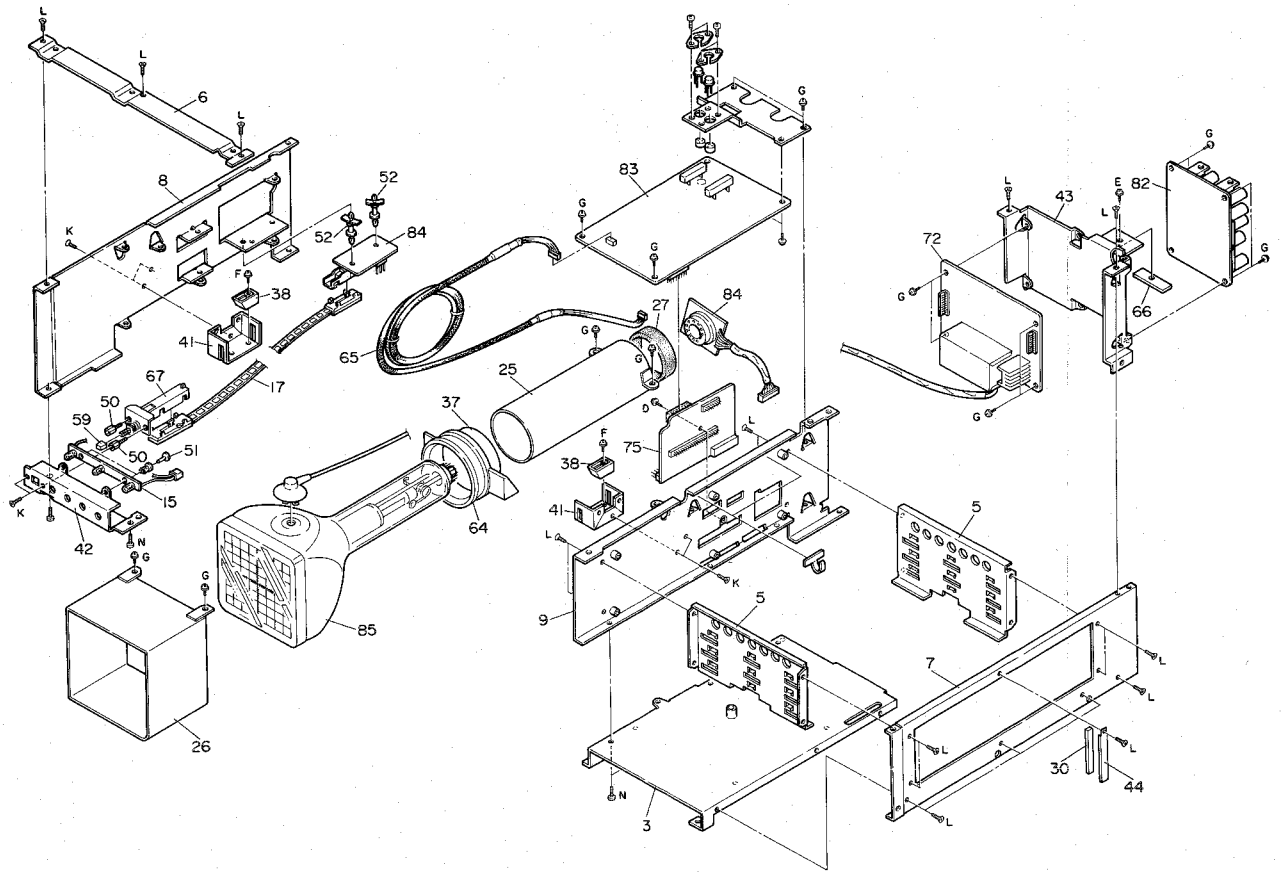


DISASSEMBLY



DCS-9000 (2/3)

DISASSEMBLY



DCS-9000 (3/3)

HIGH VOLTAGE UNIT

X68-1590-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	F01-0813-05	HEAT SINK (CONVERTER)
	F10-1601-04	SHIELD PLATE
	J70-0024-12	PCB (UNMOUNTED)
	N30-3006-46	SCREW, P-TT M3 X10
	W02-2080-05	HIGH VOLTAGE BLOCK
C1	CE04EW1H221M	CAP, ELECTRO 220 20% 35V
C2	CE04EW1H331M	CAP, ELECTRO 330 20% 35V
C3	CK45F8J472K	CAP, CERAMIC 4700P 10% 50V
C4	CK45FR1H222K	CAP, CERAMIC 2200P 10% 50V
C5	CC45F5FSL2R1DJ	CAP, CERAMIC 2.0P 5% 500V
C6	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C7	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C8	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C9	CK45F8J102K	CAP, CERAMIC 1000P 10% 500V
C10	C91-1358-05	CAP, MYLAR 0.15 10% 63V
C11	C91-1358-05	CAP, MYLAR 0.15 10% 63V
C12	CK45E3F192P	CAP, CERAMIC 1000P 3.15KV
C13	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C14	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C15	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C16	CK45F8J472K	CAP, CERAMIC 4700P 10% 500V
C17	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C18	CK45FB31102K	CAP, CERAMIC 1000P 10% 500V
C19	CE04EW1J101M	CAP, ELECTRO 100 20% 63V
C20	CK45F8J472K	CAP, CERAMIC 4700P 10% 500V
C21	CK45FCH2R5D1C	CAP, CERAMIC 1P 0.25P 500V
C22	CK45FCH2R5D1C	CAP, CERAMIC 1P 0.25P 500V
C23	C91-1361-05	CAP, MYLAR 0.33 10% 100V
C24	CK45FCH2R5D20C	CAP, CERAMIC 2P 0.25P 500V
C25	CK45FCH2R5D10C	CAP, CERAMIC 1P 0.25P 500V
C26	CE04EW1H8010M	CAP, ELECTRO 1 20% 50V
C27	CK45F8J472K	CAP, CERAMIC 4700P 10% 500V
C28	CE04W2E333M	CAP, ELECTRO 3.3 20% 250V
C29	CE04EW1J101M	CAP, ELECTRO 100 20% 25V
C30	CE04EW1E101M	CAP, ELECTRO 100 20% 25V
C31	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C32	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C33	C91-1317-05	CAP, CERAMIC 0.01 80/-20% 25
C34	C91-1357-05	CAP, MYLAR 0.1 10% 100V
C35	CE04W2C3R3X	CAP, ELECTRO 3.3 20% 160V
C36	CE04W2C3R3X	CAP, ELECTRO 3.3 20% 160V
C41	CE04EW1E101M	CAP, ELECTRO 100 20% 25V
C42	C91-1367-05	CAP, MYLAR 0.1 10% 100V
C43	CE04EW0J102M	CAP, ELECTRO 1000 20% 6.3V
C44	CE04EW1E101M	CAP, ELECTRO 100 20% 25V
C45	CK45F8J2H152K	CAP, CERAMIC 1500P 10% 500V
C46	CK45F8J2H152K	CAP, CERAMIC 1500P 10% 500V
C47	CA45B2H103K	CAP, CERAMIC 0.01 10% 500V
D1	1SS132	DIODE
D2	1SS132	DIODE
D3	1SS132	DIODE
D4	1SS83	DIODE
D5	1SS83	DIODE
D6	1SS83	DIODE
D7	1SS83	DIODE
D8	1SS83	DIODE
D9	1SS83	DIODE
D10	1SS83	DIODE
D13	1SS83	DIODE
L1	L40-3925-04	FERRI INDUCTOR 3.9UH 5%
L2	L40-1011-04	FERRI INDUCTOR 100UH 10%
L3	L40-1011-04	FERRI INDUCTOR 100UH 10%
L4	L40-1545-06	FERRI INDUCTOR 150UH 5%
NL1	NE-38B	NEON LAMP
NL2	NE-38B	NEON LAMP
NL3	NE-38B	NEON LAMP
NL4	NE-38B	NEON LAMP
P17	E40-5070-05	PIN CONNECTOR 13P
P18	E40-5068-05	PIN CONNECTOR 11P
Q1	2SD613(E)	TR. SI, NPN
Q2	2SA1175(F)	TR. SI, PNP
Q3	2SA1798(S,T)	TR. SI, PNP
Q4	2SC3010(S,T)	TR. SI, NPN
Q5	2SA1209(S,T)	TR. SI, PNP
Q6	2SC5011(S,T)	TR. SI, NPN
Q7	2SA1175(F)	TR. SI, PNP
Q8	2SC3015(C)	TR. SI, NPN
Q9	2SC2710	TR. SI, NPN
R1	RD14B8Z2221J	RES. CARBON 220 5% 1/6W
R2	RD14B8Z5023J	RES. CARBON 3.9K 5% 1/6W
R3	RD14B8Z2102J	RES. CARBON 1K 5% 1/6W
R4	RD14B8Z1004J	RES. CARBON 100K 5% 1/6W
R5	RD14B8Z2232J	RES. CARBON 2.2K 5% 1/6W
R6	RD14B8Z4733J	RES. CARBON 47K 5% 1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION
R9	RS14B8Z2910ZF	RES. METAL FILM 291K 1% 1/8W
R10	RS02-1034-05	RES. METAL FILM 47K 5% 1/2W
R11	RD14B8Z4704J	RES. CARBON 47 5% 1/6W
R12	RD14B8Z4734J	RES. CARBON 470K 5% 1/6W
R13	RS02-1034-05	RES. METAL FILM 47K 5% 1/2W
R14	RD14B8Z4704J	RES. CARBON 470K 5% 1/6W
R15	RD14B8Z8233J	RES. CARBON 82K 5% 1/6W
R16	RD14B8Z4700J	RES. CARBON 47 5% 1/6W
R17	RD14B8Z2R43J	RES. CARBON 0.5R 5% 1/6W
R18	RD14B8Z1134J	RES. CARBON 110K 5% 1/6W
R19	RD14B8Z8232J	RES. CARBON 82K 5% 1/6W
R20	RD14B8Z2702J	RES. CARBON 1K 5% 1/6W
R21	RD14B8Z2332J	RES. CARBON 3.3K 5% 1/6W
R22	RD14B8Z2332J	RES. CARBON 3.3K 5% 1/6W
R23	RD14B8Z2332J	RES. CARBON 3.3K 5% 1/6W
R24	RD14B8Z1134J	RES. CARBON 110K 5% 1/6W
R25	RD14B8Z2733J	RES. CARBON 75K 5% 1/6W
R26	RD14B8Z5913J	RES. CARBON 91K 5% 1/6W
R27	RD14B8Z2103J	RES. CARBON 10K 5% 1/6W
R28	RD14B8Z2332J	RES. CARBON 3.3K 5% 1/6W
R29	RD14B8Z3392J	RES. CARBON 3.9K 5% 1/6W
R32	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R33	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R34	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R35	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R36	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R37	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R38	RS14B8Z2204F	RES. METAL FILM 2.2M 1% 1/4W
R39	RD14B8Z2004J	RES. CARBON 200K 5% 1/6W
R40	RD14B8Z6804J	RES. CARBON 680K 5% 1/6W
R41	RD14B8Z6804J	RES. CARBON 680K 5% 1/6W
R42	RD14B8Z1004J	RES. CARBON 100K 5% 1/6W
R43	RD14B8Z2R23J	RES. CARBON 2.2R 5% 1/6W
R44	RD14B8Z4704J	RES. CARBON 470K 5% 1/6W
R45	RD14B8Z1854J	RES. CARBON 1.8M 5% 1/4W
R46	RD14B8Z1854J	RES. CARBON 1.8M 5% 1/4W
R47	RD14B8Z1854J	RES. CARBON 1.8M 5% 1/4W
R48	W0 USE	
R49	RD14B8Z5225J	RES. CARBON 2.2M 5% 1/4W
R50	RD14B8Z5225J	RES. CARBON 2.2M 5% 1/4W
R51	RD14B8Z5225J	RES. CARBON 2.2M 5% 1/4W
R52	RD14B8Z2233J	RES. CARBON 2.2M 5% 1/4W
R53	RD14B8Z1001J	RES. CARBON 100 5% 1/8W
R54	RD14B8Z1001J	RES. CARBON 100 5% 1/8W
R55	RD14B8Z1102J	RES. CARBON 11K 5% 1/6W
R56	RD14B8Z2102J	RES. CARBON 1K 5% 1/6W
R57	RD14B8Z1004J	RES. CARBON 100K 5% 1/6W
R58	RD14B8Z2333J	RES. CARBON 33K 5% 1/6W
R59	RD14B8Z6803J	RES. CARBON 68K 5% 1/6W
R60	RD14B8Z1001J	RES. CARBON 100 5% 1/6W
3900	RD14B8Z2133J	RES. CARBON 15K 5% 1/6W
U1	SZM4558D	IC,DUAL OP AMP
VR1	R12-5546-05	RES. SEMI FIXED 100KB
VR2	E12-8501-05	RES. SEMI FIXED 2.2SB

CONNECTION UNIT

X69-1210-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	J73-0039-22	PCB (UNMOUNTED)
P19	E38-0458-05	WIRE ASS'Y:A TO FILTER
P20	E38-0466-05	WIRE ASS'Y:A TO FILTER
P21	E38-0467-05	WIRE ASS'Y:A TO FILTER
P28	E40-7034-05	PIN CONNECTOR 40P
P29	E38-0475-05	WIRE ASS'Y:A TO CP13
P50	E40-7232-05	PIN CONNECTOR 64P
P51	E40-7230-05	PIN CONNECTOR 54P
P52	E40-7034-05	PIN CONNECTOR 40P
P53	E40-7232-05	PIN CONNECTOR 64P
P54	E40-7230-05	PIN CONNECTOR 54P
P55	E40-7234-05	PIN CONNECTOR 60P
P58	E40-7237-05	PIN CONNECTOR 20P

PARTS LIST

CONNECTION UNIT

X69-1230-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	J73-0111-03	PCB (UNMOUNTED)
P7	E40-7228-05	PIN CONNECTOR 34P
P8	E40-7240-05	PIN CONNECTOR 26P
P16	E40-7232-05	PIN CONNECTOR 7P
P17	E38-0465-05	WIRE ASS'Y:A TO KY
P55	E40-7235-05	PIN CONNECTOR 60P
P58	E40-7036-05	PIN CONNECTOR 20P

TIME BASE UNIT

X71-1150-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	E6A-0603-05	SOCKET:FOR P1
	J73-0026-22	PCB (UNMOUNTED)
C1	CC45C2H180DJ	CAP, CERAMIC 18P 5% 50V
C2	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C3	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C4	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C5	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C6	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C7	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C8	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C9	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C10	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C11	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C12	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C13	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C14	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C15	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C16	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C17	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C18	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C19	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C20	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C21	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C22	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C23	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C24	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C25	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C26	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C27	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C28	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C29	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C30	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C31	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C32	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C33	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C34	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C35	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C36	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C37	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C38	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C39	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C40	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C41	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C42	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C43	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C44	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C45	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C46	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C47	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C48	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C49	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C50	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C51	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C52	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C53	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C54	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C55	C91-1316-03	CAP, CERAMIC 0.1 80/-20% 50V
C56	C91-1361-05	CAP, MYLAR 0.01 10% 100V
C57	CC45CH1H150J	CAP, CERAMIC 15P 5% 50V
C58	CC45CH1H050C	CAP, CERAMIC 5P 0.25P 50V
C59	C91-1361-05	CAP, MYLAR 0.01 10% 100V
C60	CE04EW1C101M	CAP, ELECTRO 100 20% 16V
C61	CE04EW1C101M	CAP, ELECTRO 100 20% 16V
C62	CE04EW1C470M	CAP, ELECTRO 47 20% 16V
C63	CE04EW1C470M	CAP, ELECTRO 47 20% 16V
C64	CE04EW1C101M	CAP, ELECTRO 100 20% 16V
C65	C91-1361-05	CAP, MYLAR 0.01 10% 100V
C66	CE04EW1C101M	CAP, ELECTRO 100 20% 16V
C67	C91-1361-05	CAP, MYLAR 0.01 10% 100V
C68	CE04EW1C101M	CAP, ELECTRO 100 20% 16V
C69	C91-1361-05	CAP, MYLAR 0.01 10% 100V
C70	CE04EW1C101M	CAP, ELECTRO 100 20% 16V
C71	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C72	CC45CH1H680J	CAP, CERAMIC 68P 5% 50V
C73	C91-1316-03	CAP, CERAMIC 0.1 80/-20% 50V
C74	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C75	W0 USE	
C76	CC45CH1H820C	CAP, CERAMIC 2P 0.25P 50V
C77	X0 USE	
C78	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C79	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C80	CE04EW1C221M	CAP, ELECTRO 220 20% 16V
C81	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C82	CF92V1H105J	CAP, POLYESTER 1 5% 50V
C83	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C84	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C85	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C86	CC45CH2H101J	CAP, CERAMIC 100P 5% 50V
C87	CC45CH1H101J	CAP, CERAMIC 100P 5% 50V
C88	CC45CH1H101J	CAP, CERAMIC 100P 5% 50V
C89	CC45CH2W102J	CAP, CERAMIC 1000P 5% 450V
C90	CC45CH1E470J	CAP, CERAMIC 47P 5% 50V
C91	CC45CH1H101J	CAP, CERAMIC 100P 5% 50V
C92	CC45CH1H101J	CAP, CERAMIC 100P 5% 50V
C93	CC45CH1H220J	CAP, CERAMIC 22P 5% 50V
C94	CC45CH1E220J	CAP, CERAMIC 22P 5% 50V
C95	CC45CH1H121J	CAP, CERAMIC 120P 5% 50V
C96	CC45CH1H470J	CAP, CERAMIC 47P 5% 50V
C97	W0 USE	
C98	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C99	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C100	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C101	CQ92M1H102J	CAP, MYLAR 1000P 5% 50V
C102	C91-1315-05	CAP, CERAMIC 0.1 80/-20% 50V
C103	CQ92E1H102J	CAP, MYLAR 1000P 5% 50V
D1	1SS154	DIODE
D2	M4700	DIODE
D3	M4700	DIODE
DL1	L76-0123-03	DELAY
L4	L78-0352-05	FILTER
L5	L78-0352-05	FILTER
L6	L78-0552-05	FILTER
L7	L78-0352-05	FILTER
L8	L78-0552-05	FILTER
L9	L78-0552-05	FILTER
L10	L78-0552-05	FILTER
L11	L78-0552-05	FILTER
L12	L78-0552-05	FILTER
L13	L78-0552-05	FILTER
L14	L78-0552-05	FILTER
L15	L78-0552-05	FILTER
P1	E40-7241-05	PIN CONNECTOR 2P
P51	E40-7228-05	PIN CONNECTOR 34P
P54	E40-7228-05	PIN CONNECTOR 34P
P30A	E40-7225-05	PIN CONNECTOR 20P
P30B	E40-7229-05	PIN CONNECTOR 20P
P31A	E40-7229-05	PIN CONNECTOR 20P
P31B	E40-7229-05	PIN CONNECTOR 20P
P56A	E40-7238-05	PIN CONNECTOR 20P
P56B	E40-7238-05	PIN CONNECTOR 20P
P57A	E40-7238-05	PIN CONNECTOR 20P
P57B	E40-7238-05	PIN CONNECTOR 20P
Q1	2SA1458(E)	TR. SI, PNP
Q2	2SA1209(S,T)	TR. SI, PNP
Q3	2SC3779(D)	TR. SI, NPN
Q6	2SA1161	TR. SI, PNP
Q7	2SC4064	TR. SI, NPN
R1	RD14B8Z4741J	RES. CARBON 470 5% 1/6W
R2	RD14B8Z1021J	RES. CARBON 1K 5% 1/6W
R3	RD14B8Z1001J	RES. CARBON 100 5% 1/6W
R4	RD14B8Z3301J	RES. CARBON 330 5% 1/6W
R5	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R6	RD14B8Z4731J	RES. CARBON 470 5% 1/6W
R7	RD14B8Z7501J	RES. CARBON 750 5% 1/6W
R8	X0 USE	
R9	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R12	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R13	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R14	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R15	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R16	RD14B8Z2431J	RES. CARBON 430 5% 1/6W
R17	RD14B8Z6201J	RES. CARBON 62 5% 1/6W
R18	X0 USE	
R19	RD14B8Z2391J	RES. CARBON 390 5% 1/6W
R20	RD14B8Z2391J	RES. CARBON 390 5% 1/6W

PARTS LIST

REF.	PARTS NO	NAME & DESCRIPTION			
R23	RD1/4B82C512J	RES. CARBON	5.1K	5%	1/6W
R24	RD1/4B82C512J	RES. CARBON	5.1K	5%	1/6W
R25	RD1/4B82C512J	RES. CARBON	5.1K	5%	1/6W
R26	RD1/4B82C512J	RES. CARBON	5.1K	5%	1/6W
R27	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R28	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R29	X90-1127-05	RES. NETWORK	390		
R30	RD1/4B82C512J	RES. CARBON	5.1K	5%	1/6W
R31	RD1/4B82C512J	RES. CARBON	5.1K	5%	1/6W
R32	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R33	RD1/4B82C103J	RES. CARBON	10K	5%	1/6W
R34	RD1/4B82C682J	RES. CARBON	6.8K	5%	1/6W
R35	RD1/4B82C242J	RES. CARBON	2.4K	5%	1/6W
R36	RN1/4K82G3003F	RES. METAL FILM	3K	1%	1/8W
R37	RN1/4DK32C1202F	RES. METAL FILM	12K	1%	1/8W
R43	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R44	RD1/4B82C131J	RES. CARBON	130	5%	1/6W
R46	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R48	RD1/4B82C471J	RES. CARBON	470	5%	1/6W
R47	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R48	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R49	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R50	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R51	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R52	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R53	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R54	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R55	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R56	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R57	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R58	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R59	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R60	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R61	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R62	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R63	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R64	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R65	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R66	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R67	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R68	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R69	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R70	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R71	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R72	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R73	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R74	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R75	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R76	NO USE				
R77	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R78	RD1/4B82C242J	RES. CARBON	2.4K	5%	1/6W
R79	RD1/4B82C331J	RES. CARBON	330	5%	1/6W
R80	RD1/4B82C431J	RES. CARBON	430	5%	1/6W
R81	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R82	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R83	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R84	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R85	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R86	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R87	RD1/4B82C511J	RES. CARBON	510	5%	1/6W
R88	RD1/4B82C511J	RES. CARBON	510	5%	1/6W
R89	RD1/4B82C104J	RES. CARBON	100k	5%	1/6W
R90	NO USE				
R91	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R94	RD1/4B82C431J	RES. CARBON	430	5%	1/6W
R97	RD1/4B82C220J	RES. CARBON	33	5%	1/6W
R98	RD1/4B82C431J	RES. CARBON	430	5%	1/6W
R99	RD1/4B82C431J	RES. CARBON	430	5%	1/6W
R100	RD1/4B82C751J	RES. CARBON	750	5%	1/6W
R101	RD1/4B82C271J	RES. CARBON	270	5%	1/6W
R102	RD1/4B82C230J	RES. CARBON	23	5%	1/6W
R103	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R104	RD1/4B82C100J	RES. CARBON	10	5%	1/6W
R105	RD1/4B82C360J	RES. CARBON	36	5%	1/6W
R106	RD1/4B82C471J	RES. CARBON	470	5%	1/6W
R107	RD1/4B82C431J	RES. CARBON	430	5%	1/6W
R108	RD1/4B82C751J	RES. CARBON	750	5%	1/6W
R109	RD1/4B82C100J	RES. CARBON	10	5%	1/6W
R110	RD1/4B82C220J	RES. CARBON	22	5%	1/6W
R111	RD1/4B82C100J	RES. CARBON	10	5%	1/6W
R112	RD1/4B82C150J	RES. CARBON	15	5%	1/6W
R113	RD1/4B82C100J	RES. CARBON	10	5%	1/6W
R114	RD1/4B82C470J	RES. CARBON	47	5%	1/6W
R115	RD1/4B82C220J	RES. CARBON	22	5%	1/6W
R116	RD1/4B82C220J	RES. CARBON	22	5%	1/6W
R117	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R118	X90-1145-05	RES. NETWORK	10X4		
R119	X90-1145-05	RES. NETWORK	10X4		
R120	X90-1145-05	RES. NETWORK	10X4		
R125	X90-0652-05	RES. NETWORK	8X10K		
R126	X90-0653-05	RES. NETWORK	8X10K		

REF.NO	PARTS NO	NAME & DESCRIPTION			
R810	RD1/4B82C391J	RES. CARBON	390	5%	1/6W
R815	RD1/4B82C561J	RES. CARBON	560	5%	1/6W
TC2	C05-0464-05	CAP. TRIMMER	2P		
X1	MC10H131L	IC,DUAL D-FLIP FLOP			
X2	MC10E016L	IC,BINARY COUNTER			
X3	MC10E184L	IC,GATE FUNCTIONS			
X4	SN74LS74N	IC,DUAL D-T.F. (WITH PR&CLR)			
X5	SN74LS390N	IC,DUAL DECADE COUNTERS			
X6	SN74LS393N	IC,4-STATE BINARY COUNTER			
X7	SN74LS153N	IC,DUAL 4-1 DATA SELECTOR/MPX			
X8	SP6AG58-0	IC,PROGRAMMABLE BERULTIPLIER			
X9	SN74AS151N	IC,8-CHANNEL MULTIPLEXER			
X10	MC10E124L	IC,QUAD TTL-TO-MECL TRANSLATOR			
X11	MC10E174L	IC,DUAL 4-TO-1 MULTIPLEXER			
X12	XC10E141L	IC,4-BIT SHIFT REGISTER			
X13	MC10E125L	IC,QUAD MECL-TO-TTL TRANSLATOR			
X14	MC10E131L	IC,DUAL D-FLIP FLOP			
X15	HD74BC596AP	IC,8-BIT SHIFT REGISTER/LATCH			
X16	MC10H125L	IC,GATE FUNCTION			
X17	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
X18	SN74AS161N	IC,SYNCHRONOUS DECADE COUNTESS			
X19	SN74AS161N	IC,SYNCHSONOUS DECADE COUNTERS			
X20	SN74AS160N	IC,SYNCHRONOUS DECADE COUNTERS			
X21	SN74LS541N	IC,OCTAL BUS BUFFER(3-STATE)			
X22	SN74LS544N	IC,OCTAL BUS BUFFER(3-STATE)			
X23	HD74BC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
X24	HD74BC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
X25	74F190PC	IC,UP/DOWN BINARY COUNTER			
X26	74F193PC	IC,UP/DOWN BINARY COUNTER			
X27	74F190PC	IC,UP/DOWN BINARY COUNTER			
X28	HD74BC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
X29	74F190PC	IC,UP/DOWN BINARY COUNTER			
X30	74F190PC	IC,UP/DOWN BINARY COUNTER			
X31	74F193PC	IC,UP/DOWN BINARY COUNTER			
X32	74F193PC	IC,UP/DOWN BINARY COUNTER			
X33	74F193PC	IC,UP/DOWN BINARY COUNTER			
X34	HD74BC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
X35	HD74BC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
X36	HD74BC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
X37	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
X38	SN74LS96N	IC,5-BIT SHIFT REGISTERS			
X39	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
X40	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X41	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X42	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X43	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X44	SN74AS08N	IC,QUAD 2-INPUT AND GATE			
X45	SN74LS08N	IC,QUAD 2-INPUT AND GATE			
X46	SN74AS00N	IC,QUAD 2-INPUT NAND GATE			
X47	SN74LS04N	IC,HEX INVERTER			
X48	XC10H104L	IC,GATE FUNCTION			
X49	SN74ALS08N	IC,QUAD 2 INPUT AND GATE			
X50	SN74AS32N	IC,QUAD 2-INPUT OR GATE			
X51	SN74AS08N	IC,QUAD 2-INPUT AND GATE			
X52	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X53	XJM4558D	IC,DUAL OP AMP			
X56	XC10H125L	IC,QUAD MECL-TO-TLL TRANSLATOR			
X57	TC74HC123AP	IC,DUAL NONOSTABLE MULTIVIB.			
X58	SN74AS32N	IC,QUAD 2-INPUT OR GATE			
X59	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X60	SN74AS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
X61	SN74AS00N	IC,QUAD 2-INPUT NAND GATE			
X1	L77-1672-15	CRYSTAL RESONATOR (10MHZ)			

PARTS LIST

VERTICAL UNIT

X73-1900-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	B21-0867-05	AERIAL TERMINAL
	E31-2178-03	JUMPING WIRE
	J21-4764-02	BRACKET,ATT
	J21-6606-04	SPACER
	J73-0031-12	PCB (UNMOUNTED)
	N32-3006-41	SCREW,FLAT 3B X3X8
	R92-0156-05	JUMPING RES. ZERO OHM(10MM)
	R92-0180-05	JUMPING RES. ZERO OHM(10MM)
	R92-1061-05	JUMPING RES. ZERO OHM (3MM)
C1	CE04E1A331M	CAP. ELECTRO 330 20% 10V
C2	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C3	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C4	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C5	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C6	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C7	CE04E1A331M	CAP. ELECTRO 330 20% 10V
C8	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C9	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C10	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C11	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C12	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C13	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C14	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C15	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C16	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C17	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C18	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C19	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C20	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C21	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C22	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C23	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C24	CE04E0J102M	CAP. ELECTRO 1000 20% 6.3V
C102	CE04E1C331M	CAP. ELECTRO 330 20% 16V
C103	CE04E1C331M	CAP. ELECTRO 330 20% 16V
C104	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C105	C91-2838-05	CAP. MYLAR 3P 0.25P 35V
C106	CC45C91E270J	CAP. CERAMIC 27P 5% 50V
C107	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C108	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C109	NO USE	
C110	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C201	CE01E1C331M	CAP. ELECTRO 330 20% 16V
C202	CE04E1C331M	CAP. ELECTRO 330 20% 16V
C203	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C204	C91-2838-05	CAP. MYLAR 3P 0.25P 35V
C205	CC45C91E270J	CAP. CERAMIC 27P 5% 50V
C206	CC45CH1H102J	CAP. CERAMIC 1000P 5% 50V
C207	CC45FC2H101J	CAP. CERAMIC 100P 5% 50V
C208	C91-1351-05	CAP. MYLAR 0.01 10% 100V
C209	NO USE	
C210	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C302	CE04E1C331M	CAP. ELECTRO 330 20% 16V
C303	CE01E1C331M	CAP. ELECTRO 330 20% 16V
C304	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C305	C91-2838-05	CAP. MYLAR 3P 0.25P 35V
C306	CC45CH1H102J	CAP. CERAMIC 1000P 5% 50V
C307	CC45FC2H101J	CAP. CERAMIC 100P 5% 50V
C308	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C309	NO USE	
C310	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C402	CE04E1C331M	CAP. ELECTRO 330 20% 16V
C403	CE01E1C331M	CAP. ELECTRO 330 20% 16V
C404	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C405	C91-2838-05	CAP. MYLAR 3P 0.25P 35V
C406	CC45CH1E270J	CAP. CERAMIC 27P 5% 50V
C407	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C408	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C409	NO USE	
C410	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C501	CC45FCH1H010C	CAP. CERAMIC 1P 0.25P 50V
C502	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C503	CC45FSL1H221J	CAP. CERAMIC 220P 5% 50V
C504	CC45FSL1H221J	CAP. CERAMIC 220P 5% 50V
C505	CC45FCH1H101J	CAP. CERAMIC 100P 5% 50V
C506	CC45FCH1H680J	CAP. CERAMIC 68P 5% 50V
C507	CC45CH1H102K	CAP. CERAMIC 1000P 10% 50V
C508	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C509	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C510	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C511	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C512	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C700	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C701	NO USE	
C702	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C703	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C704	NO USE	
C705	CE04E1C470M	CAP. ELECTRO 47 20% 16V

REF.NO	PARTS NO	NAME & DESCRIPTION
C706	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C707	NO USE	
C708	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C709	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C710	NO USE	
C711	CE04E1C470M	CAP. ELECTRO 47 20% 16V
C802	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C803	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C810	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C811	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C818	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C819	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C825	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C827	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C835	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C839	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C840	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C841	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C842	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C843	CE04E1A331M	CAP. ELECTRO 1 20% 50V
C844	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C845	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C846	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C847	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C848	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C849	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C850	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C851	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C852	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C853	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C854	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C855	CE04E1C101M	CAP. ELECTRO 100 20% 16V
C856	CC45CH1H100D	CAP. CERAMIC 10P 0.5P 50V
C857	CC45CH1H100D	CAP. CERAMIC 10P 0.5P 50V
C858	CC45CH1H100D	CAP. CERAMIC 10P 0.5P 50V
C859	CC45CH1H100D	CAP. CERAMIC 10P 0.5P 50V
C860	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C861	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C862	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C863	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C864	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C865	NO USE	
C866	CC45FCH1H020C	CAP. CERAMIC 2P 0.25P 50V
C867	CC45FCH1H020C	CAP. CERAMIC 2P 0.25P 50V
C868	CC45FCZ1H020C	CAP. CERAMIC 2P 0.25P 50V
C869	CC45FCZ1H020C	CAP. CERAMIC 2P 0.25P 50V
C870	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C871	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C872	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C873	C91-1357-05	CAP. MYLAR 0.1 10% 100V
C874	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C875	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C876	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C877	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C878	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C879	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C880	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C881	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C888	CC45CH1H100D	CAP. CERAMIC 10P 0.5P 50V
D101	1SS132	DIODE
D102	1SS132	DIODE
D103	1SS132	DIODE
D104	1SS132	DIODE
D105	1SS132	DIODE
D201	1SS132	DIODE
D202	1SS132	DIODE
D203	1SS132	DIODE
D204	1SS132	DIODE
D205	1SS132	DIODE
D301	1SS132	DIODE
D302	1SS132	DIODE
D303	1SS132	DIODE
D304	1SS132	DIODE
D305	1SS132	DIODE
D401	1SS132	DIODE
D402	1SS132	DIODE
D403	1SS132	DIODE
D404	1SS132	DIODE
D405	1SS132	DIODE
D801	XTZ3.3JA	DIODE, ZENER 3.27V
K101	S76-0613-05	RELAY
K102	S76-0613-05	RELAY
K103	S76-0613-05	RELAY

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
X201	S76-0613-05	RELAY
X202	S76-0613-05	RELAY
X203	S76-0612-05	RELAY
X301	S76-0613-05	RELAY
X302	S76-0613-05	RELAY
X303	S76-0612-05	RELAY
X401	S76-0613-05	RELAY
X402	S76-0613-05	RELAY
X403	S76-0612-05	RELAY
L1	L79-0581-05	FILTER
L2	L79-0551-05	FILTER
L3	L79-0551-05	FILTER
L4	L79-0551-05	FILTER
L5	L79-0551-05	FILTER
L6	L79-0551-05	FILTER
L7	L79-0551-05	FILTER
L8	L79-0551-05	FILTER
L9	L79-0551-05	FILTER
L10	L79-0551-05	FILTER
L11	L79-0551-05	FILTER
L12	L79-0551-05	FILTER
L101	L40-6882-70	FERRI INDUCTOR 0.68UH 20%
L201	L40-6882-70	FERRI INDUCTOR 0.68UH 20%
L301	L40-6882-70	FERRI INDUCTOR 0.68UH 20%
L401	L40-6882-70	FERRI INDUCTOR 0.68UH 20%
P1	E40-3237-05	PIN CONNECTOR 2P
P2	E40-3237-05	PIN CONNECTOR 2P
P3	E40-3237-05	PIN CONNECTOR 2P
P4	E40-3237-05	PIN CONNECTOR 2P
P5	E40-3238-05	PIN CONNECTOR 3P
P6	E40-3237-05	PIN CONNECTOR 2P
P7	E40-7230-05	PIN CONNECTOR 34P
Q101	2SC4048	TR. SI, XPN
Q102	2SC4048	TR. SI, XPN
Q201	2SC4048	TR. SI, XPN
Q202	2SC4048	TR. SI, XPN
Q301	2SC4048	TR. SI, NPN
Q302	2SC4048	TR. SI, NPN
Q401	2SC4048	TR. SI, NPN
Q402	2SC4048	TR. SI, NPN
Q501	2SC3779(D)	TR. SI, NPN
Q502	2SC3779(D)	TR. SI, NPN
Q503	2SA1175(F)	TR. SI, PNP
Q504	2SA1905(K)	TR. SI, PNP
Q505	2SA1905(K)	TR. SI, PNP
Q506	2SC3779(D)	TR. SI, NPN
Q507	2SC3779(D)	TR. SI, NPN
Q508	2SA1206(K)	TR. SI, PNP
Q509	2SA1206(K)	TR. SI, PNP
Q510	2SA1458	TR. SI, PNP
Q511	2SA1458	TR. SI, PNP
Q512	2SA1458	TR. SI, PNP
Q513	2SA1458	TR. SI, PNP
Q514	2SA1458	TR. SI, PNP
Q515	2SA1458	TR. SI, PNP
Q601	2SK882-KEN	FET, N-CHANNEL
Q602	2SK882-KEN	FET, N-CHANNEL
R101	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R102	RD14BB2C511J	RES. CARBON 510 5% 1/6W
R103	RK14BB2C3049	RES. METAL FILM 15 1% 1/6W
R104	RS14BB2C1500D	RES. METAL FILM 150 0.5% 1/6W
R105	RK14BB2C7582D	RES. METAL FILM 75.0 0.5% 1/6W
R106	RK14BB2C7582D	RES. METAL FILM 75.0 0.5% 1/6W
R107	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R108	RD14BB2C300J	RES. CARBON 30 5% 1/6W
R109	RD14BB2C620J	RES. CARBON 62 5% 1/6W
R110	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R111	RD14BA2C220J	RES. CARBON 22 5% 1/6W
R112	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R113	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R114	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R115	RK14BB2C4742	RES. CARBON 4.7K 5% 1/6W
R116	RD14BA2C220J	RES. CARBON 22 5% 1/6W
R117	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R118	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R119	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R120	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R121	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R122	RD14BB2C123J	RES. CARBON 12K 5% 1/6W
R123	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R124	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION
R125	RD14BB2C123J	RES. CARBON 12K 5% 1/6W
R126	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R127	RD14BB2C303J	RES. CARBON 30K 5% 1/6W
R128	RD14BB2C203J	RES. CARBON 20K 5% 1/6W
R129	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R130	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R131	RD14BB2C333J	RES. CARBON 33K 5% 1/6W
R132	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R133	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R134	RD14BB2C103J	RES. CARBON 1K 5% 1/6W
R135	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R136	RK14BB2C1004F	RES. METAL FILM 1M 1% 1/6W
R137	RD14BB2C390J	RES. CARBON 39 5% 1/6W
R138	RD14BB2CB22J	RES. CARBON 8.2K 5% 1/6W
R139	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R140	RK14BB2C1801F	RES. METAL FILM 1.8K 1% 1/6W
R141	RN14D22C4701F	RES. METAL FILN 4.7K 1% 1/6W
R142	RD14BB2C243J	RES. CARBON 24K 5% 1/6W
R143	RD14BB2C393J	RES. CARBON 39K 5% 1/6W
R144	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R145	RD14BD2C161J	RES. CARBON 160 5% 1/6W
R146	RD14BB2CB21J	RES. CARBON 820 5% 1/6W
R147	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R148	RD14BB2C105J	RES. CARBON 100K 5% 1/6W
R149	RD14BB2C163J	RES. CARBON 16K 5% 1/6W
R197	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R198	RD14BB2C105J	RES. CARBON 1M 5% 1/6W
R199	RD14BB2CB25J	RES. CARBON 2.2 5% 1/6W
R200	NO USE	
R201	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R202	RD14BB2C511J	RES. CARBON 510 5% 1/6W
R203	RN14BB2C1004F	RES. METAL FILM 1M 1% 1/6W
R204	RN14BA2C1500D	RES. METAL FILM 150 0.5% 1/6W
R205	RN14BA2C7582D	RES. METAL FILM 75.0 0.5% 1/6W
R206	RN14BA2C7582D	RES. METAL FILM 75.0 0.5% 1/6W
R207	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R208	RD14BB2C390J	RES. CARBON 39 5% 1/6W
R209	RD14BA2C820J	RES. CARBON 82 5% 1/6W
R210	RD14BA2C220J	RES. CARBON 22 5% 1/6W
R211	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R212	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R213	RD14BB2C181J	RES. CARBON 180 5% 1/6W
R214	RD14BA2C302J	RES. CARBON 3K 5% 1/6W
R215	RN14BB2C4743	RES. CARBON 470K 5% 1/6W
R216	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R217	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R218	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R219	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R220	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R221	RD14BB2C153J	RES. CARBON 15K 5% 1/6W
R222	RD14BB2C123J	RES. CARBON 12K 5% 1/6W
R223	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R224	RD14BB2C562J	RES. CARBON 5.6K 5% 1/6W
R225	RD14BB2C123J	RES. CARBON 12K 5% 1/6W
R226	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R227	RD14BB2C303J	RES. CARBON 30K 5% 1/6W
R228	RD14BB2C203J	RES. CARBON 20K 5% 1/6W
R229	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R230	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R231	RD14BB2C333J	RES. CARBON 33K 5% 1/6W
R232	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R233	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R234	RD14BB2C103J	RES. CARBON 1K 5% 1/6W
R235	RD14B32C104J	RES. CARBON 100K 5% 1/6W
R236	RK14BB2C1004F	RES. METAL FILM 1M 1% 1/6W
R237	RD14BB2C308J	RES. CARBON 38 5% 1/6W
R238	RD14BB2C8B2J	RES. CARBON 8.2K 5% 1/6W
R239	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R240	RN14BB2C1001F	RES. METAL FILM 1.5K 1% 1/6W
R241	RN14BB2C4701F	RES. METAL FILM 4.7K 1% 1/6W
R242	RD14BB2C243J	RES. CARBON 24K 5% 1/6W
R243	RD14BB2C333J	RES. CARBON 33K 5% 1/6W
R244	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R245	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R246	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R247	RD14BB2C100J	RES. CARBON 10 5% 1/6W
R248	RD14BB2C104J	RES. CARBON 100K 5% 1/6W
R249	RD14BB2C163J	RES. CARBON 16K 5% 1/6W
R297	RD14BB2C103J	RES. CARBON 10K 5% 1/6W
R298	RD14BB2C102J	RES. CARBON 1K 5% 1/6W
R299	RD14BB2CB25J	RES. CARBON 2.2 5% 1/6W
R300	NO USE	
R301	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R302	RD14BB2CB51J	RES. CARBON 510 5% 1/6W
R303	RN14B42C1004F	RES. METAL FILM 1M 1% 1/6W
R304	RN14BA2C1500D	RES. METAL FILM 150 0.5% 1/6W
R305	RN14BA2C7582D	RES. METAL FILM 75.0 0.5% 1/6W
R306	RN14BA2C7582D	RES. METAL FILM 75.0 0.5% 1/6W
R307	RD14BB2C101J	RES. CARBON 100 5% 1/6W
R308	RD14BB2C390J	RES. CARBON 39 5% 1/6W
R309	RD14BB2C820J	RES. CARBON 82 5% 1/6W
R310	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R311	RD14BB2C220J	RES. CARBON 22 5% 1/6W
R312	RD14BB2C221J	RES. CARBON 220 5% 1/6W
R313	RD14BB2C161J	RES. CARBON 150 5% 1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION				
R314	RD14BB2C302J	RES. CARBON	3K	5%	1/6W	
R315	RD14B62C474J	RES. CARBON	470K	5%	1/6W	
R316	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R317	RD14BB2C153J	RES. CARBON	15K	5%	1/6W	
R318	RD14BB2C302J	RES. CARBON	3K	5%	1/6W	
R319	RD14BB2C103J	RES. CARBON	10K	5%	1/6W	
R320	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W	
R321	RD14BB2C153J	RES. CARBON	15K	5%	1/6W	
R322	RD14BB2C123J	RES. CARBON	12K	5%	1/6W	
R323	RD14BB2C103J	RES. CARBON	10K	5%	1/6W	
R324	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W	
R325	RD14BB2C123J	RES. CARBON	12K	5%	1/6W	
R326	RD14BB2C103J	RES. CARBON	10K	5%	1/6W	
R327	RD14BB2C303J	RES. CARBON	30K	5%	1/6W	
R328	RD14BB2C203J	RES. CARBON	20K	5%	1/6W	
R329	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R330	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R331	RD14BB2C533J	RES. CARBON	33K	5%	1/6W	
R332	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R333	RD14B62C820J	RES. CARBON	82	5%	1/6W	
R334	RD14BB2C182J	RES. CARBON	1K	5%	1/6W	
R335	RD14BB2C104J	RES. CARBON	100K	5%	1/6W	
R336	RK14BK2C104F	RES. METAL FILM	1M	1%	1/6W	
R337	RD14BK2C390J	RES. CARBON	39	5%	1/6W	
R338	RD14BB2C683J	RES. CARBON	68K	5%	1/6W	
R339	RD14BB2C104J	RES. CARBON	100K	5%	1/6W	
R340	RK14BK2C1301F	RES. METAL FILM	1.3K	1%	1/6W	
R341	RK14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W	
R342	RD14BB2C243J	RES. CARBON	24K	5%	1/6W	
R343	RD14B62C393J	RES. CARBON	39K	5%	1/6W	
R344	RD14BB2C221J	RES. CARBON	220	5%	1/6W	
R345	RD14B62C161J	RES. CARBON	160	5%	1/6W	
R346	RD14B62C221J	RES. CARBON	220	5%	1/6W	
R347	RD14BB2C100J	RES. CARBON	10	5%	1/6W	
R348	RD14BB2C104J	RES. CARBON	100K	5%	1/6W	
R349	RD14B52C183J	RES. CARBON	18K	5%	1/6W	
R397	RD14B62C103J	RES. CARBON	10K	5%	1/6W	
R398	RD14B62C103J	RES. CARBON	10K	5%	1/6W	
R399	RD14B82C2R2J	RES. CARBON	2.2	5%	1/6W	
R400	NO USE					
R401	RD14B52C820J	RES. CARBON	82	5%	1/6W	
R402	RD14B82C511J	RES. CARBON	510	5%	1/6W	
R403	RK14B42C1004F	RES. METAL FILM	1M	1%	1/6W	
R404	RK14B42C1R05D	RES. METAL FILM	1.05	0.5%	1/6W	
R405	RK14B42C75R0D	RES. METAL FILM	75.0	0.5%	1/6W	
R406	RK14B42C75R0D	RES. METAL FILM	75.0	0.5%	1/6W	
R407	RD14B52C101J	RES. CARBON	100	5%	1/6W	
R408	RD14B52C390J	RES. CARBON	39	5%	1/6W	
R409	RD14B52C820J	RES. CARBON	82	5%	1/6W	
R410	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R411	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R412	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W	
R413	RD14B62C161J	RES. CARBON	160	5%	1/6W	
R414	RD14B62C393J	RES. CARBON	39K	5%	1/6W	
R415	RK14BB2C4742	RES. CARBON	470K	5%	1/6W	
R416	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R417	RD14B82C153J	RES. CARBON	15K	5%	1/6W	
R418	RD14BB2C302J	RES. CARBON	3K	5%	1/6W	
R419	RD14B62C103J	RES. CARBON	10K	5%	1/6W	
R420	RD14B62C562J	RES. CARBON	5.6K	5%	1/6W	
R421	RD14B82C153J	RES. CARBON	15K	5%	1/6W	
R422	RD14B62C123J	RES. CARBON	12K	5%	1/6W	
R423	RD14B62C103J	RES. CARBON	10K	5%	1/6W	
R424	RD14BB2C562J	RES. CARBON	5.6K	5%	1/6W	
R425	RD14B62C123J	RES. CARBON	12K	5%	1/6W	
R426	RD14B62C103J	RES. CARBON	10K	5%	1/6W	
R427	RD14B82C303J	RES. CARBON	30K	5%	1/6W	
R428	RD14B82C203J	RES. CARBON	20K	5%	1/6W	
R429	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R430	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R431	RD14B82C333J	RES. CARBON	33K	5%	1/6W	
R432	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R433	RD14B82C202J	RES. CARBON	22	5%	1/6W	
R434	RD14B62C105F	RES. CARBON	1M	5%	1/6W	
R435	RD14B62C104J	RES. CARBON	100K	5%	1/6W	
R436	RK14B42C1004F	RES. METAL FILM	1M	1%	1/6W	
R437	RK14B42C390J	RES. CARBON	39	5%	1/6W	
R438	RK13B42C822J	RES. CARBON	8.2K	5%	1/6W	
R439	RD14B62C104J	RES. CARBON	100K	5%	1/6W	
R440	RK14B13C1301F	RES. METAL FILM	1.3K	1%	1/6W	
R441	RK14B42C4701F	RES. METAL FILM	4.7K	1%	1/6W	
R442	RD14B62C243J	RES. CARBON	24K	5%	1/6W	
R443	RD14B62C393J	RES. CARBON	39K	5%	1/6W	
R444	RD14B62C221J	RES. CARBON	220	5%	1/6W	
R445	RD14B62C161J	RES. CARBON	160	5%	1/6W	
R446	RD14B62C221J	RES. CARBON	220	5%	1/6W	
R447	RD14B62C100J	RES. CARBON	10	5%	1/6W	
R448	RD14B62C104J	RES. CARBON	100K	5%	1/6W	
R449	RD14B82C163J	RES. CARBON	16K	5%	1/6W	
R497	RD14B82C103J	RES. CARBON	10K	5%	1/6W	
R498	RD14B82C102J	RES. CARBON	1K	5%	1/6W	
R499	RD14B62C2R2J	RES. CARBON	2.2	5%	1/6W	

REF.NO	PARTS NO	NAME & DESCRIPTION				
R509	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R510	RD14B62C220J	RES. CARBON	22	5%	1/6W	
R511	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R512	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R513	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R514	RD14BB2C220J	RES. CARBON	22	5%	1/6W	
R515	RD14BB2C101J	RES. CARBON	100	5%	1/6W	
R516	RD14BB2C101J	RES. CARBON	100	5%	1/6W	
R517	RD14BB2C102J	RES. CARBON	1K	5%	1/6W	
R518	RD14BB2C102J	RES. CARBON	1K	5%	1/6W	
R519	RK14BB2CR200F	RES. METAL FILM	820	1%	1/6W	
R520	RK14BB2CR200F	RES. METAL FILM	820	1%	1/6W	
R521	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W	
R522	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W	
R523	RD14BB2C102J	RES. CARBON	1K	5%	1/6W	
R524	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W	
R525	RD14BB2C911J	RES. CARBON	910	5%	1/6W	
R526	RD14BB2C911J	RES. CARBON	910	5%	1/6W	
R527	RD14BB2C822J	RES. CARBON	8.2K	5%	1/6W	
R528	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W	
R529	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W	
R530	RK14BB2CR200F	RES. METAL FILM	820	1%	1/6W	
R531	RK14BB2CR200F	RES. METAL FILM	820	1%	1/6W	
R532	RK14BB2CG000F	RES. METAL FILM	300	1%	1/6W	
R533	RK14BB2CG000F	RES. METAL FILM	300	1%	1/6W	
R534	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W	
R535	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W	
R536	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W	
R537	NO USE					
R538	RK14BB2CG680F	RES. METAL FILM	68.0	1%	1/8W	
R539	RK14BB2CG680F	RES. METAL FILM	68.0	1%	1/8W	
R540	RD14BB2C102J	RES. CARBON	1K	5%	1/6W	
R541	RD14B52C683J	RES. CARBON	68K	5%	1/6W	
R542	RD14B42C683J	RES. CARBON	68K	5%	1/6W	
R543	RD14B42C680J	RES. CARBON	68Ω	5%	1/6W	
R544	RD14B42C680J	RES. CARBON	68Ω	5%	1/6W	
R545	RD14B52C681J	RES. CARBON	680	5%	1/6W	
R546	RD14B52C681J	RES. CARBON	680	5%	1/6W	
R547	RD14B42C223J	RES. CARBON	22K	5%	1/8W	
R548	RD14B62C223J	RES. CARBON	22K	5%	1/6W	
R549	RD14B42C223J	RES. CARBON	22K	5%	1/8W	
R550	RD14B72C223J	RES. CARBON	22K	5%	1/6W	
R551	RD14B62C223J	RES. CARBON	22K	5%	1/6W	
R552	RD14B62C223J	RES. CARBON	22K	5%	1/6W	
R553	RD14B82C302J	RES. CARBON	3K	5%	1/8W	
R554	NO USE					
R555	RD14B82C393J	RES. CARBON	3.9K	5%	1/8W	
R601	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R602	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R603	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R604	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R605	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R606	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R607	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R608	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R609	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R610	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R611	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R612	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R613	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R614	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R615	RK14B82C4741J	RES. CARBON	470K	5%	1/6W	
R616	RD14B82C750J	RES. CARBON	75	5%	1/6W	
R617	RD14B82C103J	RES. CARBON	10K	5%	1/6W	
R624	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R625	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R626	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R627	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R628	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R629	RD14B82C220J	RES. CARBON	22	5%	1/6W	
R630	RK14B82C474J	RES. CARBON	470K	5%	1/6W	
R631	RD14B82C303J	RES. CARBON	30K	5%	1/6W	
R632	RD14B82C102J	RES. CARBON	1K	5%	1/6W	
R633	RD14B82C202J	RES. CARBON	2K	5%	1/6W	
R634	RD14B82C183J	RES. CARBON	18K	5%	1/6W	
R635	RD14B82C102J	RES. CARBON	1K	5%	1/6W	
R636	RD14B82C103J	RES. CARBON	10K	5%	1/6W	
R637	RD14B82C102J	RES. CARBON	1K	5%	1/6W	
R638	RD14B82C102J	RES. CARBON	1K	5%	1/6W	
R639	RD14B82C102J	RES. CARBON	1K	5%	1/6W	
R640	RD14B82C103J	RES. CARBON	10K	5%	1/6W	
R641	RD14B82C101J	RES. CARBON	100	5%	1/6W	
R642	RD14B82C101J	RES. CARBON	100	5%	1/6W	
R643	RD14B82C101J	RES. CARBON	100	5%	1/6W	
R801	RD14B42C472J	RES. CARBON	4.7K	5%	1/8W	
R802	RD14B72C751J	RES. CARBON	750	5%	1/6W	
R803	RD14B62C472J	RES. CARBON	4.7K	5%	1/6W	
R804	RD14B72C751J	RES. CARBON	750	5%	1/6W	
R805	RD14B82C472J	RES. CARBON	4.7K	5%	1/8W	
R806	RD14B72C751J	RES. CARBON	750	5%	1/6W	
R807	RD14B82C472J	RES. CARBON	4.7K	5%	1/8W	
R808	RD14B82C751J	RES. CARBON	750	5%	1/8W	
R809	RD14B82C202J	RES. CARBON	2K	5%	1/8W	
R810	RK14B82C2401F	RES. METAL FILM	2K	1%	1/8W	

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
XB13	#82-1188-05	RES. LT3000	470	5%	1/5W
XB12	#31482C2001F	RES. METAL FILM	2K	1%	1/6W
XB13	#82-1188-05	RES. LT3000	470	5%	1/6W
XB16	#31482C751J	RES. CARBON	750	5%	1/6W
XB17	#31482R4300F	RES. METAL FILM	430	1%	1/4W
XB18	#31482C101J	RES. CARBON	100	5%	1/6W
XB19	#31482C101J	RES. CARBON	100	5%	1/6W
XB20	#31482C101J	RES. CARBON	100	5%	1/6W
XB21	#31482C101J	RES. CARBON	100	5%	1/6W
XB22	#31482C101J	RES. CARBON	100	5%	1/6W
XB23	#31482C101J	RES. CARBON	100	5%	1/6W
XB24	#31482C153J	RES. CARBON	15K	5%	1/6W
XB25	#31482C153J	RES. CARBON	15K	5%	1/6W
XB26	#31482C153J	RES. CARBON	15K	5%	1/6W
XB27	#31482C153J	RES. CARBON	15K	5%	1/6W
XB28	#31482C684J	RES. CARBON	680K	5%	1/6W
XB28	#31482C913J	RES. CARBON	9.1K	5%	1/6W
XB30	#31482C331J	RES. CARBON	330	5%	1/6W
XB31	#31482C331J	RES. CARBON	330	5%	1/6W
XB32	#31482C331J	RES. CARBON	330	5%	1/6W
XB33	#31482C331J	RES. CARBON	330	5%	1/6W
XB34	#31482C331J	RES. CARBON	330	5%	1/6W
XB35	#31482C331J	RES. CARBON	330	5%	1/6W
XB36	#31482C272J	RES. CARBON	2.7K	5%	1/6W
XB37	#31482C272J	RES. CARBON	2.7K	5%	1/6W
XB38	#31482C272J	RES. CARBON	2.7K	5%	1/6W
XB39	#31482C272J	RES. CARBON	2.7K	5%	1/6W
XB40	#31432C103J	RES. CARBON	10K	5%	1/6W
XB41	#31482C103J	RES. CARBON	10K	5%	1/6W
XB42	#31482C103J	RES. CARBON	10K	5%	1/6W
XB43	#31482C103J	RES. CARBON	10K	5%	1/6W
XB44	#31482C181J	RES. CARBON	180	5%	1/6W
XB45	#31482C181J	RES. CARBON	180	5%	1/6W
XB46	#31482C181J	RES. CARBON	180	5%	1/6W
XB47	#31482C181J	RES. CARBON	180	5%	1/6W
XB52	#31482C228F	RES. METAL FILM	22.0	1%	1/6W
XB53	#31482C228F	RES. METAL FILM	22.0	1%	1/6W
XB54	#31482C226J	RES. CARBON	22	5%	1/6W
XB55	#31482C226J	RES. CARBON	22	5%	1/6W
S101	#02-2137-05	ATTENUATOR UNIT			
S201	#02-2137-05	ATTENUATOR UNIT			
S301	#02-2137-05	ATTENUATOR UNIT			
S401	#02-2137-05	ATTENUATOR UNIT			
TC101	C05-0470-05	CAP. TRIMMER	20P		
TC102	C05-0472-05	CAP. CERAMIC	120P		
TC103	C05-0472-05	CAP. TRIMMER	6PF TO 50PF		
TC201	C05-0470-05	CAP. TRIMMER	20P		
TC202	C05-0473-05	CAP. CERAMIC	120P		
TC203	C05-0472-05	CAP. TRIMMER	6PF TO 50PF		
TC301	C05-0470-05	CAP. TRIMMER	20P		
TC302	C05-0473-05	CAP. CERAMIC	120P		
TC303	C05-0472-05	CAP. TRIMMER	6PF TO 50PF		
TC401	C05-0470-05	CAP. TRIMMER	20P		
TC402	C05-0473-05	CAP. CERAMIC	120P		
TC403	C05-0472-05	CAP. TRIMMER	6PF TO 50PF		
TC502	C05-0473-05	CAP. CERAMIC	120P		
U1	HD74HC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
U2	HD74HC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
U3	HD74HC595AP	IC,8-BIT SHIFT REGISTER/LATCH			
U4	HD74HC595FP	IC,8-BIT SHIFT REGISTER/LATCH			
U5	HD74HC595FP	IC,8-BIT SHIFT REGISTER/LATCH			
U6	HD74HC595FP	IC,8-BIT SHIFT REGISTER/LATCH			
U7	HD74HC595FP	IC,8-BIT SHIFT REGISTER/LATCH			
U101	NJC04	IC,LINEAR			
U102	LM6364N	IC,OP AMP			
U103	NJC05	IC,LINEAR			
U104	NJC06	IC,LINEAR			
U105	NJM4558D	IC,DUAL OP AMP			
U106	NJC08	IC,LINEAR			
U201	NJC04	IC,LINEAR			
U202	LM6364N	IC,OP AMP			
U203	NJC05	IC,LINEAR			
U204	NJC06	IC,LINEAR			
U205	NJM4558D	IC,DUAL OP AMP			
U206	NJC08	IC,LINEAR			
U301	NJC04	IC,LINEAR			
U302	LM6364N	IC,OP AMP			
U303	NJC05	IC,LINEAR			
U304	NJC06	IC,LINEAR			
U305	NJM4558D	IC,DUAL OP AMP			
U306	NJC08	IC,LINEAR			

REF.NO	PARTS NO	NAME & DESCRIPTION
U401	NJC04	IC,LINEAR
U402	LM6364N	IC,OP AMP
U403	NJC05	IC,LINEAR
U404	NJC06	IC,LINEAR
U405	NJM4558D	IC,DUAL OP AMP
U406	NJC08	IC,LINEAR
U501	NJC11	IC,LINEAR
U502	NJC11	IC,LINEAR
U503	NJC11	IC,LINEAR
U504	NO USE	
U505	SN74ALS112AN	IC,DUAL J-K F.F.(WITH PR&CLR)
U506	SN74ALS112AN	IC,DUAL J-K F.F.(WITH PR&CLR)
U507	SN74ALS00AN	IC,QUAD 2 INPUT NAND GATE
U508	SN74ALS00AN	IC,QUAD 2 INPUT NAND GATE
U601	NJC07	IC,LINEAR
U602	NJC07	IC,LINEAR
U603	NJC07	IC,LINEAR
U604	NJC08	IC,LINEAR
U605	NJM4558D	IC,DUAL OP AMP
VR1	R12-3543-05	RES. SEMI FIXED 20KB
VR101	R12-0571-05	RES. SEMI FIXED 500 B
VR102	R12-5526-05	RES. SEMI FIXED 100KB
VR103	R12-2520-05	RES. SEMI FIXED 5KB
VR104	R12-5526-05	RES. SEMI FIXED 100KB
VR105	NO USE	
VR106	R12-5526-05	RES. SEMI FIXED 100KB
VR107	R12-5526-05	RES. SEMI FIXED 100KB
VR108	R12-1539-05	RES. SEMI FIXED 2KB
VR109	R12-5526-05	RES. SEMI FIXED 100KB
VR110	R12-5526-05	RES. SEMI FIXED 100KB
VR111	R12-0269-05	RES. SEMI FIXED 100 B
VR112	R12-3453-05	RES. SEMI FIXED 10KB
VR201	R12-0571-05	RES. SEMI FIXED 500 B
VR202	R12-5526-05	RES. SEMI FIXED 100KB
VR203	R12-2520-05	RES. SEMI FIXED 5KB
VR204	R12-5526-05	RES. SEMI FIXED 100KB
VR205	NO USE	
VR206	R12-5526-05	RES. SEMI FIXED 100KB
VR207	R12-5526-05	RES. SEMI FIXED 100KB
VR208	R12-1539-05	RES. SEMI FIXED 2KB
VR209	R12-5526-05	RES. SEMI FIXED 100KB
VR210	R12-5526-05	RES. SEMI FIXED 100KB
VR211	R12-0269-05	RES. SEMI FIXED 100 B
VR212	R12-3453-05	RES. SEMI FIXED 10KB
VR301	R12-0571-05	RES. SEMI FIXED 500 B
VR302	R12-5526-05	RES. SEMI FIXED 100KB
VR303	R12-2520-05	RES. SEMI FIXED 5KB
VR304	R12-5526-05	RES. SEMI FIXED 100KB
VR305	NO USE	
VR306	R12-5526-05	RES. SEMI FIXED 100KB
VR307	R12-5526-05	RES. SEMI FIXED 100KB
VR308	R12-1539-05	RES. SEMI FIXED 2KB
VR309	R12-5526-05	RES. SEMI FIXED 100KB
VR310	R12-5526-05	RES. SEMI FIXED 100KB
VR311	R12-0269-05	RES. SEMI FIXED 100 B
VR312	R12-3453-05	RES. SEMI FIXED 10KB
VR401	R12-0571-05	RES. SEMI FIXED 500 B
VR402	R12-5526-05	RES. SEMI FIXED 100KB
VR403	R12-2520-05	RES. SEMI FIXED 5KB
VR404	R12-5526-05	RES. SEMI FIXED 100KB
VR405	NO USE	
VR406	R12-5526-05	RES. SEMI FIXED 100KB
VR407	R12-5526-05	RES. SEMI FIXED 100KB
VR408	R12-1539-05	RES. SEMI FIXED 2KB
VR409	R12-5526-05	RES. SEMI FIXED 100KB
VR410	R12-5526-05	RES. SEMI FIXED 100KB
VR411	R12-0269-05	RES. SEMI FIXED 100 B
VR412	R12-3453-05	RES. SEMI FIXED 10KB
VR301	R12-3543-05	RES. SEMI FIXED 20KB
VR302	R12-3543-05	RES. SEMI FIXED 20KB
VR601	R12-5526-05	RES. SEMI FIXED 100KB
VR612	R12-3453-05	RES. SEMI FIXED 10KB

PARTS LIST

HORIZONTAL UNIT

X74-1530-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	J73-0022-12	PCB (UNMOUNTED)			
	L02-0110-05	FERRITE BEADS			
C1	CQ92FR1H104J	CAP. MYLAR	0.1	5%	50V
C2	CFN2YH684J	CAP. POLYESTER	0.68	5%	50V
C3	CFN2YH684J	CAP. POLYESTER	0.68	5%	50V
C4	CC45SCH1H101J	CAP. CERAMIC	100	5%	50V
C5	SO USE				
C6	CC45SCH1H050C	CAP. CERAMIC	5P	0.25P	50V
C7	C91-1357-65	CAP. MYLAR	0.1	10%	100V
C8	CC45SFH1H102Z	CAP. CERAMIC	1000P	10%	50V
C9	C91-1361-65	CAP. MYLAR	0.01	10%	100V
C10	CQN2FR1E682K	CAP. MYLAR	6800P	10%	50V
C11	CR04FW1E010K	CAP. ELECTRO	1	20%	25V
C12	C91-1358-05	CAP. MYLAR	0.15	10%	63V
C13	CC45CCH1H101J	CAP. CERAMIC	100P	5%	50V
C14	CR04HW1E220M	CAP. ELECTRO	22	20%	25V
C15	CC45PCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C16	CR04HW1E220M	CAP. ELECTRO	22	20%	25V
C17	CR04AW1C470M	CAP. ELECTRO	47	20%	16V
C18	CR04AW1C470M	CAP. ELECTRO	47	20%	16V
C19	C91-1357-65	CAP. MYLAR	0.1	10%	100V
C20	CR04AW1C335M	CAP. ELECTRO	3.3	20%	16V
C21	C91-1357-65	CAP. MYLAR	0.1	10%	100V
C22	C91-1357-65	CAP. MYLAR	0.1	10%	100V
C23	NO USE				
C24	CC45CCH1H101J	CAP. CERAMIC	100P	5%	50V
C25	CQ92YR1H472J	CAP. MYLAR	4700P	5%	50V
C26	C34GYB1H102K	CAP. CERAMIC	1000P	10%	50V
C27	C91-1357-65	CAP. MYLAR	0.1	10%	100V
C28	NO USE				
C29	CC45PCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C30	C31-1272-05	CAP. POLYESTER	1.5	5%	100V
C31	C91-1361-65	CAP. MYLAR	0.01	10%	100V
C32	CC35FCH1H220D	CAP. CERAMIC	10P	0.5P	50V
C33	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C34	CQ92SR1H331J	CAP. MYLAR	330P	5%	50V
C35	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C36	CFN2YH224J	CAP. POLYESTER	0.22	5%	50V
C37	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C38	NO USE				
C39	CC45CCH1H100D	CAP. CERAMIC	10P	0.5P	50V
C40	C31-1272-05	CAP. POLYESTER	1.5	5%	100V
C41	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C42	CC45CCH1H470J	CAP. CERAMIC	47P	5%	50V
C43	CC45SPH1H102K	CAP. CERAMIC	1000P	10%	50V
C44	NO USE				
C45	C91-1357-65	CAP. MYLAR	0.1	10%	100V
C51	CC45FCH1J910J	CAP. CERAMIC	91P	5%	50V
C52	CC45FCH1J121J	CAP. CERAMIC	120P	5%	50V
C53	C91-1361-65	CAP. MYLAR	0.01	10%	100V
C54	CC45FCH1E101J	CAP. CERAMIC	100P	5%	50V
C57	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C58	CC45FCH1H330J	CAP. CERAMIC	33P	5%	50V
C59	C91-1361-65	CAP. MYLAR	0.01	10%	100V
C60	NO USE				
C61	CC45CCH1H220J	CAP. CERAMIC	22P	5%	50V
C62	CC45PCH1H040C	CAP. CERAMIC	4P	0.25P	50V
C63	NO USE				
C64	CR04EW1A471M	CAP. ELECTRO	470	20%	10V
C65	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C66	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C67	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C68	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C69	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C70	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C71	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C72	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C73	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C74	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C75	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C76	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C77	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C78	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C79	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C80	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C81	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C82	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C83	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C84	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C85	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C86	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C87	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C88	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C89	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C90	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C91	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C92	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C93	CE04EW1C471M	CAP. ELECTRO	470	20%	16V
C94	CE04EW1C471M	CAP. ELECTRO	470	20%	16V
C95	CE04EW1C331K	CAP. ELECTRO	330	20%	16V
C96	CE04EW1C331K	CAP. ELECTRO	330	20%	16V

REF.NO	PARTS NO	NAME & DESCRIPTION			
C97	CE04EW1A471M	CAP. ELECTRO	470	20%	10V
C98	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C99	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C100	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C101	CR04HW1C010M	CAP. ELECTRO	100	20%	16V
C102	CC45CCH1H151J	CAP. CERAMIC	150P	5%	50V
C103	CC45FCH1H151J	CAP. CERAMIC	150P	5%	50V
C104	CC45FCH1H270J	CAP. CERAMIC	27P	5%	50V
C105	CC45FCH1H270J	CAP. CERAMIC	27P	5%	50V
C106	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C107	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C108	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C200	CE01EW1C331F	CAP. ELECTRO	330	20%	16V
C201	CE04EW1A331F	CAP. ELECTRO	330	20%	10V
C202	CC45FCH1H682J	CAP. CERAMIC	68P	5%	50V
C203	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C502	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C503	NO USE				
C504	CC45CCH1H101J	CAP. CERAMIC	100P	5%	50V
C505	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C801	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
C802	NO USE				
C803	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C804	CR04HW1C100M	CAP. ELECTRO	1000	20%	16V
C805	CC45CCH1H120J	CAP. CERAMIC	12P	5%	50V
C806	CC45FCH1H101J	CAP. CERAMIC	100P	5%	50V
C807	CC45FCH1E101J	CAP. CERAMIC	100P	5%	50V
C808	NO USE				
C809	CR04EW1E101M	CAP. ELECTRO	100	20%	25V
C810	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C811	CC45FCH1H030C	CAP. CERAMIC	3P	0.25P	50V
C814	CC45FCH1H390J	CAP. CERAMIC	39P	5%	50V
C815	CQN2FM1H123J	CAP. MYLAR	0.012	5%	50V
C816	CC45FCH1H220J	CAP. CERAMIC	22P	5%	50V
C817	NO USE				
C818	CQN2FM1H223J	CAP. MYLAR	0.022	5%	50V
C819	CC45FCH1H470J	CAP. CERAMIC	47P	5%	50V
C820	CK45R2E103K	CAP. CERAMIC	0.01	10%	500V
C821	CE04EW1C331K	CAP. ELECTRO	330	20%	16V
C822	CE04EW1A331K	CAP. ELECTRO	330	20%	6.3V
C823	CE04EW1C220K	CAP. ELECTRO	22	20%	16V
C824	CE04AW0J331K	CAP. ELECTRO	330	20%	6.3V
C827	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C828	CC45CCH1H101J	CAP. CERAMIC	100P	5%	50V
C829	CK45B1H102K	CAP. CERAMIC	1000P	10%	50V
C830	CC45CCH1H050C	CAP. CERAMIC	5P	0.25P	50V
D1	1SS132	DIODE			
D2	1SS132	DIODE			
D3	MA700	DIODE			
D4	MA700	DIODE			
D5	MA700	DIODE			
D6	MA700	DIODE			
D7	MTZ2.6JA	DIODE, ZENER	2.96V		
D8	MTZ3.6JA	DIODE, ZENER	2.96V		
D9	1SS132	DIODE			
D10	MA700	DIODE			
D11	MA700	DIODE			
D12	MA700	DIODE			
D13	MA700	DIODE			
D14	MA700	DIODE			
D15	1SS132	DIODE			
D16	MA700	DIODE			
D17	MA700	DIODE			
D18	MA700	DIODE			
D19	1SS132	DIODE			
D20	1SS132	DIODE			
D21	MA700	DIODE			
D23	MA700	DIODE			
D24	MA700	DIODE			
D25	TLR112	LED,RED			
D26	TLR112	LED,RED			
D27	MA700	DIODE			
D28	NO USE				
D29	MA700	DIODE			
D30	MA700	DIODE			
D31	MA700	DIODE			
D34	1SS132	DIODE			
D35	1SS132	DIODE			
D36	1SS132	DIODE			
D37	NO USE				
D38	1SS132	DIODE			
D39	NO USE				
D40	MA700	DIODE			
D41	MA700	DIODE			
D502	MA700	DIODE			
D503	MA700	DIODE			
D504	1SS132	DIODE			
D505	MA700	DIODE			
D506	MA700	DIODE			
D507	MA700	DIODE			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
D508	1SS132	DIODE
D509	1SS132	DIODE
D510	NO USE	
D511	1SS132	DIODE
D512	1SS132	DIODE
D513	1SS132	DIODE
D514	1SS132	DIODE
D802	NA708	DIODE
J3	RMZ-1081-05	JUMPING RES. ZERO OHM (53R)
K1	S51-1527-05	RELAY
K2	S51-1527-05	RELAY
L1	L70-0551-05	FILTER
L2	L70-0551-05	FILTER
L3	L70-0551-05	FILTER
L4	L40-2212-70	FERRI INDUCTOR 220UH 20%
L5	NO USE	
P5	E40-3237-05	PIN CONNECTOR 2P
P11	E40-3240-05	PIN CONNECTOR 5P
P12	E40-3243-05	PIN CONNECTOR 8P
P16	E40-7209-05	PIN CONNECTOR SOP
Q1	2SA1206(L)	TR. SI. PNP
Q2	2SC3354(S)	TR. SI. NPN
Q3	2SA1586	TR. SI. PNP
Q4	2SA1586	TR. SI. PNP
Q5	2SC0779(D)	TR. SI. NPN
Q6	2SB1175(F)	TR. SI. PNP
Q7	2SK304(F)	FET. N-CHANNEL
Q8	2SK241(GR)	FET. N-CHANNEL
Q9	2SA1206(L)	TR. SI. PNP
Q10	2SC2785(F)	TR. SI. NPN
Q11	2SA1206(K)	TR. SI. PNP
Q12	2SC3315(C)	TR. SI. NPN
Q13	2SC3315(C)	TR. SI. NPN
Q14	2SC2785(F)	TR. SI. NPN
Q15	2SC3315(C)	TR. SI. NPN
Q16	2SC3315(C)	TR. SI. NPN
Q17	2SC2785(F)	TR. SI. NPN
Q18	2SA1175(F)	TR. SI. PNP
Q19	2SC2785(F)	TR. SI. NPN
Q20	2SC2732(L)	TR. SI. NPN
Q21	2SA1206(K)	TR. SI. PNP
Q22	2SC3315(C)	TR. SI. NPN
Q23	2SC2785(F)	TR. SI. NPN
Q24	2SC3315(C)	TR. SI. NPN
Q25	2SC3315(C)	TR. SI. NPN
Q26	2SC3315(C)	TR. SI. NPN
Q27	2SC3315(C)	TR. SI. NPN
Q28	2SC3315(C)	TR. SI. NPN
Q29	2SC3315(C)	TR. SI. NPN
Q30	2SC3315(C)	TR. SI. NPN
Q31	2SC3315(C)	TR. SI. NPN
Q32	2SA1005(K)	TR. SI. PNP
Q33	2SC3315(C)	TR. SI. NPN
Q34	2SC3315(C)	TR. SI. NPN
Q35	2SA1005(K)	TR. SI. PNP
Q36	2SC3315(C)	TR. SI. NPN
Q37	2SK76G-KEY	FET. N-CHANNEL
Q38	2SK583-KEY	FET. N-CHANNEL
Q39	2SK582-KEY	FET. N-CHANNEL
Q40	2SA1175(F)	TR. SI. PNP
Q41	2SC2785(F)	TR. SI. NPN
Q42	2SA1005(K)	TR. SI. PNP
Q43	2SA1005(K)	TR. SI. PNP
Q46	2SC2785(F)	TR. SI. NPN
Q47	2SC2785(F)	TR. SI. NPN
Q48	2SA1203(K)	TR. SI. PNP
Q49	2SC3354(S)	TR. SI. NPN
Q50	2SK241(GR)	FET. N-CHANNEL
Q51	2SK241(GR)	FET. N-CHANNEL
Q52	2SA1586	TR. SI. PNP
Q53	2SC3732(L)	TR. SI. NPN
Q54	2SA1203(K)	TR. SI. PNP
Q55	2SA1565	TR. SI. PNP
Q56	2SC2785(F)	TR. SI. NPN
Q57	2SK583-KEY	FET. N-CHANNEL
Q80	2SA1565	TR. SI. PNP
Q503	2SA1206(K)	TR. SI. PNP
Q504	2SC3315(C)	TR. SI. NPN
Q505	2SC3315(C)	TR. SI. NPN
Q506	2SA1459(L)	TR. SI. PNP
Q507	2SC4049	TR. SI. NPN
Q803	2SC2785(F)	TR. SI. NPN
R1	RD14DH2C201J	RES. CARBON 200 5% 1/6W
R2	RD14DH2C22DJ	RES. CARBON 22 5% 1/6W
R3	RD14DH2C220J	RES. CARBON 22 5% 1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION
R4	RD14DH2C332J	RES. CARBON 3.3K 5% 1/6W
R5	RD14DH2C220J	RES. CARBON 22 5% 1/6W
R6	RC14DH2E220J	RES. CARBON 22 5% 1/6W
R7	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R8	RD14DH2C220J	RES. CARBON 22 5% 1/6W
R9	RD13DH2C221J	RES. CARBON 220 5% 1/6W
R10	RD14DH2C221J	RES. CARBON 220 5% 1/6W
R11	RD14DH2C104J	RES. CARBON 100K 5% 1/6W
R12	RD14DH2C220J	RES. CARBON 22 5% 1/6W
R13	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R14	RD14DH2C220J	RES. CARBON 22 5% 1/6W
R17	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R18	RD14DH2C393J	RES. CARBON 39K 5% 1/6W
R19	RD14DH2C181J	RES. CARBON 180 5% 1/6W
R20	RD14DH2C753J	RES. CARBON 75K 5% 1/6W
R21	RD0-0658-05	RES. NETWORK 4E510
R22	RD14DH2C163J	RES. CARBON 16K 5% 1/6W
R23	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R24	RD14DH2C333J	RES. CARBON 33K 5% 1/6W
R25	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R26	RD14DH2C183J	RES. CARBON 18K 5% 1/6W
R27	RD14DH2C203J	RES. CARBON 20K 5% 1/6W
R28	RD14DH2C472J	RES. CARBON 4.7K 5% 1/6W
R29	RD14DH2C393J	RES. CARBON 39K 5% 1/6W
R30	RD14DH2C473J	RES. CARBON 47K 5% 1/6W
R31	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R32	RD14DH2C332J	RES. CARBON 3.3K 5% 1/6W
R33	RD14DH2C332J	RES. CARBON 3.3K 5% 1/6W
R34	RD14DH2C105J	RES. CARBON 1M 5% 1/6W
R35	RD14DH2C105J	RES. CARBON 1M 5% 1/6W
R36	RD14DH2C105J	RES. CARBON 1M 5% 1/6W
R37	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R38	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R39	RD14DH2C223J	RES. CARBON 22K 5% 1/6W
R40	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R41	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R42	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R43	RD14DH2C222J	RES. CARBON 2.2K 5% 1/6W
R44	RD14DH2C473J	RES. CARBON 47K 5% 1/6W
R45	RD14DH2C473J	RES. CARBON 47K 5% 1/6W
R46	RD14DH2C473J	RES. CARBON 47K 5% 1/6W
R47	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R48	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R49	RD14DH2C222J	RES. CARBON 2.2K 5% 1/6W
R50	RD14DH2C472J	RES. CARBON 4.7K 5% 1/6W
R51	RD14DH2C472J	RES. CARBON 4.7K 5% 1/6W
R52	RD14DH2C471J	RES. CARBON 470 5% 1/6W
R53	RD14DH2C474J	RES. CARBON 470K 5% 1/6W
R54	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R55	RD14DH2C684J	RES. CARBON 680K 5% 1/6W
R56	RD14DH2C472J	RES. CARBON 47 5% 1/6W
R57	RD14DH2C470J	RES. CARBON 47 5% 1/6W
R58	NO USE	
R59	RD14DH2C332J	RES. CARBON 3.3K 5% 1/6W
R60	RD14DH2C332J	RES. CARBON 3.3K 5% 1/6W
R61	RD14DH2C333J	RES. CARBON 33K 5% 1/6W
R62	RD14DH2C333J	RES. CARBON 33K 5% 1/6W
R63	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R64	RD14DH2C334J	RES. CARBON 330K 5% 1/6W
R65	RD14DH2C274J	RES. CARBON 270K 5% 1/6W
R66	NO USE	
R67	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R68	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R69	RD14DH2C331J	RES. CARBON 330 5% 1/6W
R70	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R71	RD14DH2C105J	RES. CARBON 1M 5% 1/6W
R72	NO USE	
R73	RD14DH2C681J	RES. CARBON 680 5% 1/6W
R74	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R75	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R76	RN0-0660-03	RES. NETWORK 4X1K
R77	RD14DH2C103J	RES. CARBON 10K 5% 1/6W
R78	RD14DH2C151J	RES. CARBON 150 5% 1/6W
R79	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R80	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R81	RD14DH2C622J	RES. CARBON 6.2K 5% 1/6W
R82	RD14DH2C391J	RES. CARBON 390 5% 1/6W
R83	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R84	RD14DH2C471J	RES. CARBON 470 5% 1/6W
R85	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R86	RD14DH2C105J	RES. CARBON 1M 5% 1/6W
R87	RD14DH2C684J	RES. CARBON 680 5% 1/6W
R88	RD14DH2C102J	RES. CARBON 1K 5% 1/6W
R89	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R90	RN14BH2C1002F	RES. METAL FILM 10K 1% 1/6W
R91	RN14BH2C1202F	RES. METAL FILM 12K 1% 1/6W
R92	RD14DH2C104J	RES. CARBON 100 5% 1/6W
R93	RN14BH2C1202F	RES. METAL FILM 12K 1% 1/6W
R94	RN14BH2C1202F	RES. METAL FILM 12K 1% 1/6W
R95	RN14BH2C1502F	RES. METAL FILM 15K 1% 1/6W
R96	RN14BH2C3601F	RES. METAL FILM 3.6K 1% 1/6W
R97	RD14DH2C101J	RES. CARBON 100 5% 1/6W
R98	RD14DH2C471J	RES. CARBON 470 5% 1/6W
R99	RN14BH2C2401F	RES. METAL FILM 2.4K 1% 1/6W
R100	RN14BH2C3002F	RES. METAL FILM 30K 1% 1/6W
R101	RD14DH2C103J	RES. CARBON 10K 5% 1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R102	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R103	RD14BR5C472J	RES. CARBON	4.7K	5%	1/6W
R104	RD14BR2C333J	RES. CARBON	33K	5%	1/6W
R105	RD14BR2C752J	RES. CARBON	7.5K	5%	1/6W
R106	RS14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R107	RS14BK2C1102F	RES. METAL FILM	11K	1%	1/6W
R108	RD14BR2C153J	RES. CARBON	15K	5%	1/6W
R109	RS14BK2C6801F	RES. METAL FILM	6.8K	1%	1/6W
R110	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R111	RD14BR2C223J	RES. CARBON	22K	5%	1/6W
R112	RS14BK2C1301F-	RES. METAL FILM	1.3K	1%	1/6W
R113	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R114	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R115	RD14BR2C684J	RES. CARBON	680K	5%	1/6W
R116	RD14BR2C223J	RES. CARBON	22K	5%	1/6W
R117	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R118	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R119	RS14BK2C2401F	RES. METAL FILM	2.4K	1%	1/6W
R120	RS14BK2C3001F	RES. METAL FILM	300	1%	1/6W
R121	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R122	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R123	RD14BR5C472J	RES. CARBON	4.7K	5%	1/6W
R124	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R125	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R126	RD14BR3C683J	RES. CARBON	68K	5%	1/6W
R127	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R128	RD14BR2C822J	RES. CARBON	8.2K	5%	1/6W
R129	RD14BR2C391J	RES. CARBON	390	5%	1/6W
R130	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R131	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R132	RD14BR2C302J	RES. CARBON	3K	5%	1/6W
R133	RD14BR2C751J	RES. CARBON	750	5%	1/6W
R134	RD14BR2C101J	RES. CARBON	1K	5%	1/6W
R137	RD14BR2C181J	RES. CARBON	180	5%	1/8W
R138	RD14BR2C152J	RES. CARBON	1.5K	5%	1/8W
R139	RD14BR2C333J	RES. CARBON	3.3K	5%	1/8W
R140	RD14BR2C151J	RES. CARBON	150	5%	1/8W
R141	RD14BR2C104J	RES. CARBON	100K	5%	1/8W
R142	RD14BR2C113J	RES. CARBON	11K	5%	1/8W
R143	RD14BR2C101J	RES. CARBON	100	5%	1/8W
R144	RN14BK2C2251F	RES. METAL FILM	2.2K	1%	1/8W
R145	RN14BK2C2203F	RES. METAL FILM	220K	1%	1/8W
R150	R90-0660-05	RES. NETWORKS	4X1K		
R154	RD14BR2C331J	RES. CARBON	330	5%	1/6W
R155	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R156	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R157	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R158	RD14BR2C470J	RES. CARBON	47	5%	1/6W
R159	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R160	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R161	RD14BR2C203J	RES. CARBON	20K	5%	1/6W
R162	RD14BR2C332J	RES. CARBON	3.3K	5%	1/6W
R163	RD14BR2C243J	RES. CARBON	24K	5%	1/6W
R166	RD14BR2C822J	RES. CARBON	8.2K	5%	1/6W
R167	RD14BR2C822J	RES. CARBON	8.2K	5%	1/6W
R168	RD14BR2C473J	RES. CARBON	47K	5%	1/6W
R169	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R170	RN14BK2C2001F	RES. METAL FILM	2K	1%	1/6W
R171	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R172	RD14BR2C202J	RES. CARBON	2K	5%	1/6W
R173	RD14BR2C202J	RES. CARBON	2K	5%	1/6W
R174	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R175	RD14BR2C332J	RES. CARBON	3.3K	5%	1/6W
R176	RD14BR2C242J	RES. CARBON	2.4K	5%	1/6W
R177	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R178	NO USE				
R179	RD14BR2C221J	RES. CARBON	220	5%	1/6W
R180	RD14BR2C273J	RES. CARBON	27K	5%	1/6W
R181	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R182	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R183	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R184	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R185	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R186	RD14BR2C302J	RES. CARBON	3K	5%	1/6W
R187	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R188	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R189	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R190	RD14BR2C683J	RES. CARBON	68K	5%	1/6W
R191	RD14BR2C362J	RES. CARBON	3.6K	5%	1/6W
R192	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R193	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R194	R90-1124-05	RES. NETWORK	5X10K		
R199	RD14BR3C102J	RES. CARBON	1K	5%	1/6W
R200	RD14BR2C333J	RES. CARBON	3.3K	5%	1/6W
R201	RD14BR3C332J	RES. CARBON	3.3K	5%	1/6W
R202	RD14BR3C561J	RES. CARBON	560	5%	1/6W
R203	RD14BR2C393J	RES. CARBON	39K	5%	1/6W
R204	RD14BR3C392J	RES. CARBON	3.9K	5%	1/6W
R205	RD14BR2C432J	RES. CARBON	4.3K	5%	1/6W
R206	RD14BR2C473J	RES. CARBON	47K	5%	1/6W
R207	RD14BR2C473J	RES. CARBON	47K	5%	1/6W
R208	RD14BR2C473J	RES. CARBON	47K	5%	1/6W
R209	NO USE				

REF.NO	PARTS NO	NAME & DESCRIPTION			
R210	RD14BR2C221J	RES. CARBON	220	5%	1/6W
R211	RD14BR2C221J	RES. CARBON	220	5%	1/6W
R212	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R213	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R214	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R215	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R216	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R217	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R218	RD14BR2GB82J	RES. CARBON	8.2K	5%	1/6W
R219	RD14BR2GB04J	RES. CARBON	680	5%	1/6W
R220	RD14BR2C684J	RES. CARBON	680	5%	1/6W
R221	RD14BR3C823J	RES. CARBON	8.2K	5%	1/6W
R222	RD14BR2C752J	RES. CARBON	7.5K	5%	1/6W
R223	RD14BR2C332J	RES. CARBON	3.3K	5%	1/6W
R224	RD14BR2C302J	RES. CARBON	3K	5%	1/6W
R225	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R226	RD14BR2GB21J	RES. CARBON	820	5%	1/6W
R227	RD14BR2C472J	RES. CARBON	4.7K	5%	1/6W
R228	RD14BR2C472J	RES. CARBON	4.7K	5%	1/6W
R229	RD14BR2C473J	RES. CARBON	47K	5%	1/6W
R230	RD14BR2C473J	RES. CARBON	47K	5%	1/6W
R231	RD14BR2C103J	RES. CARBON	13	5%	1/6W
R232	RD14BR2C333J	RES. CARBON	3.3K	5%	1/6W
R233	RD14BR2C332J	RES. CARBON	3.3K	5%	1/6W
R234	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R235	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R240	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R241	RD14BR2C222J	RES. CARBON	2.2K	5%	1/6W
R242	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R243	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R244	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R245	RD14BR2C223J	RES. CARBON	22K	5%	1/6W
R246	RN14BK2C3902F	RES. METAL FILM	39K	1%	1/8W
R247	RS14BK2C3903F	RES. METAL FILM	39K	1%	1/8W
R248	RD14BR2C683J	RES. CARBON	68K	5%	1/8W
R249	RD14BR2C122J	RES. CARBON	1.2K	5%	1/8W
R250	NO USE				
R251	RD14BR2C153J	RES. CARBON	15K	5%	1/8W
R252	RD14BR2C473J	RES. CARBON	47K	5%	1/8W
R253	RD14BR2C101J	RES. CARBON	100	5%	1/8W
R254	RD14BR2C182J	RES. CARBON	1.8K	5%	1/8W
R255	RD14BR2C183J	RES. CARBON	18K	5%	1/8W
R256	RD14BR2C183J	RES. CARBON	18K	5%	1/8W
R257	RD14BR2C152J	RES. CARBON	1.5K	5%	1/8W
R258	RD14BR2C152J	RES. CARBON	1.5K	5%	1/8W
R259	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R260	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R261	RD14BR2C472J	RES. CARBON	4.7K	5%	1/8W
R262	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R263	RD14BR2C101J	RES. CARBON	100	5%	1/8W
R264	RD14BR2C182J	RES. CARBON	1.8K	5%	1/8W
R265	RD14BR2C152J	RES. CARBON	1.5K	5%	1/8W
R266	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R267	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R268	RD14BR2C472J	RES. CARBON	4.7K	5%	1/8W
R269	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R270	RD14BR2C68AJ	RES. CARBON	680	5%	1/8W
R271	RD14BR2C103J	RES. CARBON	10K	5%	1/8W
R503	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R504	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R505	RD14BR2C622J	RES. CARBON	6.2K	5%	1/6W
R506	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R507	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R508	RD14BR2C471J	RES. CARBON	470	5%	1/6W
R509	NO USE				
R510	RD14BR2C512J	RES. CARBON	5.1K	5%	1/6W
R511	RD14BR2C302J	RES. CARBON	3K	5%	1/6W
R512	RD14BR2C123J	RES. CARBON	12K	5%	1/6W
R513	RD14BR2C222J	RES. CARBON	2.2K	5%	1/6W
R600	RD14BR2C102J	RES. CARBON	1K	5%	1/8W
R601	RD14BR2C471J	RES. CARBON	470	5%	1/8W
R602	RD14BR2C182J	RES. CARBON	1.8K	5%	1/8W
R603	R92-1189-05	RES. LT3000	1.6K	5%	1/8W
R701	RD14BR2C334J	RES. CARBON	330K	5%	1/6W
R702	RD14BR2C472J	RES. CARBON	4.7K	5%	1/6W
R703	RD14BR2GB0J	RES. CARBON	68	5%	1/6W
R704	RD14BR2GB0J	RES. CARBON	68	5%	1/6W
R705	RD14BR2C221J	RES. CARBON	220	5%	1/6W
R706	RD14BR2G31J	RES. CARBON	3.1K	5%	1/6W
R707	RD14BR2C122J	RES. CARBON	1.2K	5%	1/6W
R708	R92-1189-05	RES. LT3000	1.6K	5%	1/8W
R709	RD14BR2C152J	RES. CARBON	1.5K	5%	1/6W
R710	RD14BR2C152J	RES. CARBON	1.5K	5%	1/6W
R711	NO USE				
R712	RD14BR2C154J	RES. CARBON	150K	5%	1/6W
R713	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R716	RD14BR2C222J	RES. CARBON	2.2K	5%	1/6W
R717	RD14BR2C102J	RES. CARBON	1K	5%	1/6W
R718	RD14BR2C202J	RES. CARBON	2K	5%	1/6W
R719	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R720	RD14BR2C331J	RES. CARBON	330	5%	1/6W
R721	RD14BR2C101J	RES. CARBON	100	5%	1/6W
R722	RD14BR2C362J	RES. CARBON	3.6K	5%	1/6W
R723	RD14BR2C363J	RES. CARBON	36K	5%	1/6W
R724	RD14BR2C103J	RES. CARBON	10K	5%	1/6W
R725	RD14BR2C154J	RES. CARBON	150K	5%	1/6W
R726	RD14BR2C470J	RES. CARBON	47	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R827	RD14HB2C156J	RES. CARBOX	15K	5%	1/6W
R828	RD14HB2C334J	RES. CARBOX	330K	5%	1/6W
R829	RD14HB2C821J	RES. CARBOX	820	5%	1/6W
R830	RD14HB2C223J	RES. CARBOX	22K	5%	1/6W
R804	RN14HB2C1002F	RES. METAL FILM	10K	1%	1/6W
R805	RN14HB2C1002F	RES. METAL FILM	10K	1%	1/6W
R896	RD14HB2C222J	RES. CARBON	2.2K	5%	1/6W
R889	RD14HB2C103J	RES. CARBON	10K	5%	1/6W
TC1	C05-0471-05	CAP. TRIMMER	50P		
TC2	C05-0471-05	CAP. TRIMMER	50P		
TC3	C05-0468-05	CAP. TRIMMER	10P		
TC4	C05-0468-05	CAP. TRIMMER	10P		
TC5	C05-0473-05	CAP. CERAMIC	120P		
U1	XFCH8	IC,LINEAR			
U2	NO USE				
U3	MC74HC4052N	IC,TRIPLE 2CH ANALOG MPX/DE-MP			
U4	NJ8072BL	IC,JFET INPUT OP AMP			
U5	NJ8072BL	IC,JFET INPUT OP AMP			
U6	EA733CN	IC,DIFFERENTIAL VIDEO AMP			
U7	LM1881N	IC,VIDEO SYNC SEPARATOR			
U8	SN74LS221N	IC,DUAL MONOSTABLE MULTI			
U9	SN74LS123N	IC,DUAL MONOSTABLE MULTIVIB			
U10	NO USE				
U11	XC14011V2L	IC,GATE FUNCTION			
U12	NO USE				
U13	XC14013L	IC,DUAL D-FLIP FLOP			
U14	MC10103L	IC,QUAD 2-INPUT OR GATE			
U15	SN74LS191N	IC,SYNC. U/D 4-BIT BIXARY COUNT			
U16	SN74ALS191N	IC,SYNC. U/D 4-BIT BIXARY COUNT			
U17	SN74ALS191N	IC,SYNC. U/D 4-BIT BIXARY COUNT			
U18	KD903	IC,LINEAR			
U19	KD903	IC,LINEAR			
U20	KM701	IC,LINEAR			
U21	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
U22	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
U23	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
U24	KN614	IC,LINEAR			
U25	NJM4558D	IC,DUAL OP AMP			
U26	NJ8072BL	IC,JFET INPUT OP AMP			
U27	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
U28	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
U29	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
U30	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
U31	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
U32	HD74HC595P	IC,8-BIT SHIFT REGISTER/LATCH			
U33	SN74LS00AN	IC,QUAD 2 INPUT NAND GATE			
U34	SN74ALS02N	IC,QUAD 2 INPUT NOR			
U35	SN74ALS08N	IC,QUAD 2 INPUT AND GATE			
U36	SN74ALS04BN	IC,HEX INVERTERS			
U37	SN74LS153N	IC,DUAL 4-1 DATA SELECTOR/MPX			
U38	SN74ALS08N	IC,QUAD 2 INPUT AND GATE			
U39	SN74ALS08N	IC,QUAD 2 INPUT AND GATE			
U40	SN74ALS32N	IC,QUAD 2 INPUT OR			
U41	SN74ALS32N	IC,QUAD 2 INPUT OR			
U42	SN74ALS32N	IC,QUAD 2 INPUT OR			
U43	NC1081N4L	IC,GATE FUNCTIONS			
U44	NJ8072D	IC,DUAL JFET INPUT OP AMP			
VR1	R12-3543-05	RES. SEMI FIXED 20KB			
VR2	R12-3543-03	RES. SEMI FIXED 20KB			
VR3	R12-3543-05	RES. SEMI FIXED 20KB			
VR4	R12-2520-03	RES. SEMI FIXED 5KB			
VR5	R12-2520-05	RES. SEMI FIXED 5KB			
VR6	R12-2532-05	RES. SEMI FIXED 5KB			
VR7	R12-1538-05	RES. SEMI FIXED 1KB			
VR8	R12-3543-05	RES. SEMI FIXED 20KB			
VR9	R12-3543-05	RES. SEMI FIXED 20KB			
VR10	R12-3543-05	RES. SEMI FIXED 20KB			
VR11	R12-3542-05	RES. SEMI FIXED 20KB			
VR12	R12-2520-05	RES. SEMI FIXED 5KB			
VR13	R12-0571-05	RES. SEMI FIXED 500 B			
VR14	R12-3543-05	RES. SEMI FIXED 20KB			

DCS-9100 STO CPU UNIT

X77-1660-01

REF.NO	PARTS NO	NAME & DESCRIPTION			
	E02-0143-05	IC SOCKET	28P		
	F15-0744-05	BLIND PLATE			
	J73-0020-22	PCB (UNMOUNTED)			
B1	W09-0408-05	BATTERY,CR2354-1HF			
C1	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C2	C91-1318-05	CAP. CERAMIC	0.1	80/-20%	50V
C3	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C4	C91-1318-05	CAP. CERAMIC	0.1	80/-20%	50V
C5	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C6	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C7	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C8	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C9	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C10	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C11	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C12	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C13	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C14	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C15	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C16	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C17	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C18	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C19	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C20	NO USE				
C21	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C22	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C23	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C24	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C25	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C26	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C27	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C28	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C29	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C30	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C31	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C32	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C33	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C37	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C38	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C39	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C40	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C41	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C42	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C43	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C44	C91-1515-05	CAP. CERAMIC	0.1	80/-20%	50V
C45	C91-1515-05	CAP. CERAMIC	0.1	80/-20%	50V
C46	C91-1561-05	CAP. XYLAR	0.01	10%	100V
C47	C91-1561-05	CAP. XYLAR	0.01	10%	100V
C50	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C51	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C52	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C53	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C54	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C55	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C56	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C57	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C58	NO USE				
C59	C91-1515-05	CAP. CERAMIC	0.1	80/-20%	50V
C60	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C61	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C62	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C63	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C64	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C65	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C66	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C67	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C68	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C69	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C70	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C71	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C72	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C73	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C74	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C75	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C78	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C79	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C80	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C81	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C82	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C83	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C84	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C85	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C86	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C87	NO USE				
C88	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C89	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C90	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C91	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C92	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
C83	C81-1315-05	CAP. CERAEIC 0.1 80/-20% 50V
C84	NO USE	
C85	C81-1315-05	CAP. CERAEIC 0.1 80/-20% 50V
C101	C81-1361-05	CAP. MYLAR 0.01 10% 100V
C102	CE04EW0J101M	CAP. ELECTRO 100 20% 6.3V
C103	C81-1361-05	CAP. MYLAR 0.01 10% 100V
C104	C81-1361-05	CAP. MYLAR 0.01 10% 100V
C105	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C106	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C107	CC45CE1H101J	CAP. CERAMIC 100P 5% 50V
C108	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C109	CC45SCE1H101J	CAP. CERAMIC 100P 5% 50V
C110	C81-1313-05	CAP. CERAMIC 0.1 80/-20% 50V
C111	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C112	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C113	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C114	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C115	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C116	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C117	CE04EW1C101M	CAP. ELECTRO 100 20% 16V
C118	CE04EW1C101M	CAP. ELECTRO 100 20% 16V
C119	CE04EW0J221M	CAP. ELECTRO 220 20% 6.3V
C120	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C121	CE04EW1H010M	CAP. ELECTRO 1 20% 50V
C122	CC45CE1H270J	CAP. CERAMIC 27P 5% 50V
C123	CC45CE1H270J	CAP. CERAMIC 27P 5% 50V
C124	CC45CE1H101J	CAP. CERAMIC 100P 5% 50V
C125	CC45CE1H101J	CAP. CERAMIC 100P 5% 50V
C126	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C127	CE04EW1C101M	CAP. ELECTRO 100 20% 16V
C128	CC45CE1H270J	CAP. CERAMIC 27P 5% 50V
C129	CC45CE1H070D	CAP. CERAMIC 7P 0.5P 50V
C130	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C131	CQ92R1H102K	CAP. MYLAR 1000P 10% 50V
C132	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C133	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C134	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C135	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C136	NO USE	
C137	CQ92Y1H472J	CAP. POLYESTER 4700P 5% 50V
C138	NO USE	
C139	CC45CL1H331J	CAP. CERAMIC 330P 5% 50V
C140	CC45SL1H331J	CAP. CERAMIC 330P 5% 50V
C141	CC45CE1E220J	CAP. CERAMIC 22P 5% 50V
D1	NA700	DIODE
D2	NA700	DIODE
D3	NA700	DIODE
D4	NO USE	
D5	1SS132	DIODE
D6	1SS132	DIODE
L2	L79-0551-05	FILTER
L3	L79-0551-05	FILTER
L4	L40-2291-76	FERRI INDUCTOR 2.25UH 5%
L5	L40-2291-76	FERRI INDUCTOR 2.25UH 5%
L6	L40-1021-03	FERRI INDUCTOR 1UH 10%
L7	L79-0553-05	FILTER
L8	L40-2201-70	FERRI INDUCTOR 220U 10%
P26	E40-7033-05	PIN CONNECTOR 45P
P50	E40-7226-05	PIN CONNECTOR 64P
R1	RD14B2C473J	RES. CARBON 47K 5% 1/6W
R2	RD14B2C472J	RES. CARBON 4.7K 5% 1/6W
R3	RD14B2C472J	RES. CARBON 4.7K 5% 1/6W
R4	RD13H2C473J	RES. CARBON 47K 5% 1/4W
R5	RD13B2C473J	RES. CARBON 47K 5% 1/8W
R6	RS01-0004-05	RES. CEMENT 2K 1.7% 5W
R7	RD14A2C473J	RES. CARBON 47K 5% 1/8W
R8	RD13B2C105J	RES. CARBON 1M 5% 1/8W
R9	RD14B2C105J	RES. CARBON 1M 5% 1/6W
R10	RD14B2C153J	RES. CARBON 15K 5% 1/6W
R11	RD14B2C472J	RES. CARBON 4.7K 5% 1/6W
R12	RD14B2C472J	RES. CARBON 4.7K 5% 1/6W
R13	RD14B2C473J	RES. CARBON 47K 5% 1/6W
R14	RD14B2C103J	RES. CARBON 10K 5% 1/6W
R15	NO USE	
R16	RN14B2C6101F	RES. METAL FILM 5.1K 1% 1/6W
R17	RN14B2C8209S	RES. METAL FILM 820 1% 1/6W
R18	RD14B2C113J	RES. CARBON 11K 5% 1/6W
R19	RD14B2C8R2J	RES. CARBON 8.2R 5% 1/6W
R20	RN14B2C2001F	RES. METAL FILM 2K 1% 1/6W
R21	RN14B2C3001F	RES. METAL FILM 3K 1% 1/6W
R22	RN14B2C1001F	RES. METAL FILM 1K2 1% 1/6W
R23	RN14B2C1002F	RES. METAL FILM 10K 1% 1/6W
R24	RN14B2C3602F	RES. METAL FILM 3.6K 1% 1/6W
R25	RN14B2C4701F	RES. METAL FILM 470 1% 1/6W
R26	RN14B2C4702F	RES. METAL FILM 47K 1% 1/6W
R27	RD14B2C133J	RES. CARBON 13K 5% 1/6W
R28	RD14B2C103J	RES. CARBON 10K 5% 1/6W
R29	RN14B2C1002F	RES. METAL FILM 10K 1% 1/6W
R30	RN14B2C1002F	RES. METAL FILM 10K 1% 1/6W
R31	RD14B2C220J	RES. CARBON 22 5% 1/6W
R32	RN14B2C1001F	RES. METAL FILM 1K 1% 1/6W
R33	RN14B2C1001F	RES. METAL FILM 1K 1% 1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION
R34	RW14B2C7500F	RES. METAL FILM 750 1% 1/6W
R35	RS01-0002-07B1F	RES. METAL FILM 4.7K 1% 1/6W
R36	RD14B2C103J	RES. CARBON 10K 5% 1/6W
R37	RN14B2C1002F	RES. METAL FILM 10K 1% 1/6W
R38	RN14B2C1002F	RES. METAL FILM 10K 1% 1/6W
R39	RN14B2C1001F	RES. METAL FILM 1K 1% 1/6W
R40	RN14B2E3901F	RES. METAL FILM 3.9K 1% 1/6W
R41	NO USE	
R42	RD14B2E220J	RES. CARBON 22 5% 1/6W
R43	RN14B2C1001F	RES. METAL FILM 1K 1% 1/6W
R44	RD14B2E102J	RES. CARBON 1K 5% 1/6W
R45	RD14B2E220J	RES. CARBON 22 5% 1/6W
R46	RD14B2E220J	RES. CARBON 22 5% 1/6W
R47	RD14B2E220J	RES. CARBON 22 5% 1/6W
R48	RD14B2E220J	RES. CARBON 22 5% 1/6W
R49	RD14B2E221J	RES. CARBON 220 5% 1/6W
R50	RD14B2E221J	RES. CARBON 220 5% 1/6W
R51	RD14B2E220J	RES. CARBON 22 5% 1/6W
R52	RD14B2E220J	RES. CARBON 22 5% 1/6W
R53	RD14B2E220J	RES. CARBON 22 5% 1/6W
R54	RD14B2E220J	RES. CARBON 22 5% 1/6W
R55	RD14B2E220J	RES. CARBON 22 5% 1/6W
R56	RD14B2E220J	RES. CARBON 22 5% 1/6W
R57	RD14B2E220J	RES. CARBON 22 5% 1/6W
R58	RD14B2E220J	RES. CARBON 22 5% 1/6W
R59	RD14B2E221J	RES. CARBON 220 5% 1/6W
R60	RD14B2E221J	RES. CARBON 220 5% 1/6W
R61	RD14B2E221J	RES. CARBON 220 5% 1/6W
R62	RD14B2E221J	RES. CARBON 220 5% 1/6W
R63	RD14B2E221J	RES. CARBON 220 5% 1/6W
R64	RD14B2E221J	RES. CARBON 220 5% 1/6W
R65	RD14B2E221J	RES. CARBON 220 5% 1/6W
R66	RD14B2E221J	RES. CARBON 220 5% 1/6W
R67	RD14B2E221J	RES. CARBON 220 5% 1/6W
R68	RD14B2E221J	RES. CARBON 220 5% 1/6W
R69	RD14B2E221J	RES. CARBON 220 5% 1/6W
R70	RD14B2E221J	RES. CARBON 220 5% 1/6W
R71	RD14B2E221J	RES. CARBON 220 5% 1/6W
R72	RD14B2E221J	RES. CARBON 220 5% 1/6W
R73	RD14B2E221J	RES. CARBON 220 5% 1/6W
R74	RD14B2E221J	RES. CARBON 220 5% 1/6W
R75	RD14B2E221J	RES. CARBON 220 5% 1/6W
R76	RD14B2E221J	RES. CARBON 220 5% 1/6W
R77	RD14B2E221J	RES. CARBON 220 5% 1/6W
R78	RD14B2E221J	RES. CARBON 220 5% 1/6W
R79	RD14B2E221J	RES. CARBON 220 5% 1/6W
R80	RD14B2E221J	RES. CARBON 220 5% 1/6W
R81	RD14B2E221J	RES. CARBON 220 5% 1/6W
R82	RD14B2E221J	RES. CARBON 220 5% 1/6W
R83	RD14B2E221J	RES. CARBON 220 5% 1/6W
R84	RD14B2E221J	RES. CARBON 220 5% 1/6W
R85	RD14B2E221J	RES. CARBON 220 5% 1/6W
R86	RD14B2E221J	RES. CARBON 220 5% 1/6W
R87	RD14B2E221J	RES. CARBON 220 5% 1/6W
R88	RD14B2E101J	RES. CARBON 100 5% 1/6W
R89	RD14B2E221J	RES. CARBON 220 5% 1/6W
R90	RD14B2E221J	RES. CARBON 220 5% 1/6W
R91	RD14B2E221J	RES. CARBON 220 5% 1/6W
R92	R02-1480-05	RES. LT3000 1.6K 5% 1/6W
R93	RD14B2C131J	RES. CARBON 130 5% 1/6W
R94	RD14B2C131J	RES. CARBON 130 5% 1/6W
R95	RD14B2C131J	RES. CARBON 130 5% 1/6W
R96	RD14B2C131J	RES. CARBON 130 5% 1/6W
R97	RD14B2C131J	RES. CARBON 130 5% 1/6W
R98	RD14B2C131J	RES. CARBON 130 5% 1/6W
R99	RD14B2C131J	RES. CARBON 130 5% 1/6W
R100	RD14B2C131J	RES. CARBON 130 5% 1/6W
R101	RD14B2C131J	RES. CARBON 130 5% 1/6W
R102	RD14B2C131J	RES. CARBON 130 5% 1/6W
R103	RD14B2C131J	RES. CARBON 130 5% 1/6W
R104	RD14B2C131J	RES. CARBON 130 5% 1/6W
R105	RD14B2C131J	RES. CARBON 130 5% 1/6W
R106	RD14B2C131J	RES. CARBON 130 5% 1/6W
R107	RD14B2C131J	RES. CARBON 130 5% 1/6W
R108	RD14B2C131J	RES. CARBON 130 5% 1/6W
R109	RD14B2C7R1J	RES. CARBON 7R0 5% 1/6W
R110	RS14B2C7509F	RES. METAL FILM 750 1% 1/6W
R111	RN14B2C3001F	RES. METAL FILM 3K 1% 1/6W
R112	RD14B2C2431J	RES. CARBON 240 5% 1/6W
R113	RD14B2B471J	RES. CARBON 470 5% 1/8W
R114	RD14B2C471J	RES. CARBON 470 5% 1/6W
R115	NO USE	
R116	RD14B2C910J	RES. CARBON 91 5% 1/6W
R117	NO USE	
R118	RN14B2C4302J	RES. CARBON 4.3K 5% 1/6W
R119	NO USE	
R120	RD14B2C152J	RES. CARBON 1.5K 5% 1/6W
R121	RD14B2C152J	RES. CARBON 1.5K 5% 1/6W
R122	RD14B2C134J	RES. CARBON 130K 5% 1/6W
R123	RD14B2C103J	RES. CARBON 10K 5% 1/6W
R124	RD14B2C103J	RES. CARBON 10K 5% 1/6W
R125	R90-0286-05	RES. NET4098 414.7R 1%
R126	RD14B2C683J	RES. CARBON 68K 5% 1/6W
R127	RD14B2C681J	RES. CARBON 680 5% 1/6W
R136	RD14B2C101J	RES. CARBON 100 5% 1/6W
R137	RN14B2C1003F	RES. METAL FILM 100K 1% 1/6W
R138	NO USE	

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
R138	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R140	RD14BB2C202J	RES. CARBON 2K 5% 1/6W
R141	NO USE	
R142	RD14BB5C472J	RES. CARBON 4.7K 5% 1/6W
R143	R90-1147-05	RES. NETWORK
R144	R90-1147-05	RES. NETWORK
R145	R90-1148-05	RES. NETWORK
R146	R90-1146-05	RES. NETWORK
R147	R90-1146-05	RES. NETWORK
R148	R90-1146-05	RES. NETWORK
R149	RD14BB2C302J	RES. CARBON 3K 5% 1/6W
R150	RD14BB2C182J	RES. CARBON 1.8K 5% 1/6W
R151	RD14BB2C331J	RES. CARBON 330 5% 1/6W
R152	RD14BB2C912J	RES. CARBON 9.1K 5% 1/6W
U1	HPNT0355EJ-85BG	IC,1K-BIT CPU
U2	SN74LS245N	IC,OCTAL BUS TRANSCEIVER(3-S)
U3	SN74LS245N	IC,OCTAL BUS TRANSCEIVER(3-S)
U4	SN74ALS541N	IC,OCTAL 3-S BUFFER/LINE DRIVE
U5	SN74ALS374AN	IC,OCTAL D-F.F.
U6	T93-0869-14	PROGRAMMED ROM
U7	T93-0870-14	PROGRAMMED ROM
U8	LC3664ASL-10	IC,CMOS 64K SRAM
U9	LC3664ASL-10	IC,CMOS 64K SRAM
U10	MB84256-10LL-SK	IC,S-RAM
U11	MB84256-10LL-SK	IC,S-RAM
U12	MB84256-10LL-SK	IC,S-RAM
U13	MB84256-10LL-SK	IC,S-RAM
U14	MB84256-10LL-SK	IC,S-RAM
U15	MB84256-10LL-SK	IC,S-RAM
U16	SN74ALS245AN	IC,OCTAL BUS BUFFER
U17	SN74ALS245AN	IC,OCTAL BUS BUFFER
U18	SN74ALS241SN	IC,OCTAL BUS BUFFER
U19	LC3864ASL-10	IC,CMOS 64K SRAM
U20	HC1400GBCP	IC,QUAD ASALOG SW/QUAD MPX
U21	LC3664ASL-10	IC,CMOS 64K SRAM
U22	LC3664ASL-10	IC,CMOS 64K SRAM
U23	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U24	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U25	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U26	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U27	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U28	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U29	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U30	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U31	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U32	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U33	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U37	SN74LS393N	IC,4-STATE BINARY COUNTER
U38	SN74LS393N	IC,4-STATE BINARY COUNTER
U39	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U40	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U41	SN74ALS352N	IC,DUAL 4-1 DATA SELECT./MPX
U42	SN74ALS374AN	IC,OCTAL D-F.F.
U43	SN74LS123N	IC,DUAL MONOSTABLE MULTIVIB.
U44	XR3771	IC,RESET
U50	SN74ALS138N	IC,3-8 DECODER/DE-MPX
U51	SN74ALS245AN	IC,OCTAL BUS BUFFER
U52	SN74ALS374AN	IC,OCTAL D-F.F.
U53	SN74ALS374AN	IC,OCTAL D-F.F.
U54	SN74ALS374AN	IC,OCTAL D-F.F.
U55	SN74LS395N	IC,4-BIT SHIFT REGISTERS/LATCH
U56	SN74LS395N	IC,4-BIT SHIFT REGISTERS/LATCH
U57	SN74ALS534AN	IC,OCTAL D-F.F.(3-S)
U58	NO USE	
U59	SN74ALS374AN	IC,OCTAL D-F.F.
U60	SN74ALS374AN	IC,OCTAL D-F.F.
U61	SN74ALS374AN	IC,OCTAL D-F.F.
U62	SN74ALS374AN	IC,OCTAL D-F.F.
U63	SN74ALS374AN	IC,OCTAL D-F.F.
U64	SN74ALS374AN	IC,OCTAL D-F.F.
U65	HC14052BCP	IC,DUAL 4-CH ANALOG MPX/DE-MPX
U66	HC14052BCP	IC,DUAL 4-CH ASALOG MPX/DE-MPX
U67	SN74LS368AX	IC,HEX BUS DRIVERS
U68	DAC808GLCN	IC,8-BIT D/A CONVERTER
U69	HA17012PD	IC,12-BIT D/A CONVERTER
U70	HA17012PD	IC,12-BIT D/A CONVERTER
U71	HA17012PD	IC,12-BIT D/A CONVERTER
U72	LH0218H	IC,FAST SETTLING DUAL OP-AMP
U73	HJ0072BD	IC,JFET INPUT OP AMP
U74	SN74LS32N	IC,QUAD 2 INPUT OR
U75	SN74LS30AN	IC,8-INPUT POSITIVE-NAND GATE
U78	SN74ALS32N	IC,QUAD 2 INPUT OR
U79	SN74ALS32N	IC,QUAD 2 INPUT OR
U80	SN74ALS32N	IC,QUAD 2 INPUT OR
U81	SN74LS32N	IC,DELAY ELEMENTS
U82	SN74ALS04AN	IC,HEX INVERTERS
U83	SN74ALS08N	IC,QUAD 2 INPUT AND GATE
U84	SN74ALS08N	IC,QUAD 2 INPUT AND GATE
U85	SN74LS74AN	IC,DUAL D-F.F.(WITH PRSG&IN)
U86	SN74ALS32N	IC,QUAD 2 INPUT OR
U87	NO USE	
U88	SN74ALS74AN	IC,DUAL D-F.F. (WITH PRSG&IN)
U89	SN74ALS74AN	IC,DUAL D-F.F. (WITH PRSG&IN)
U90	CTM6011	IC,GATE ARRAY

REF.NO	PARTS NO	NAME & DESCRIPTION
U91	CTM6021	IC,GATE ARRAY
U92	CTM6021	IC,GATE ARRAY
U93	CTM6041	IC,GATE ARRAY
U94	NJU072BL	IC,JFET INPUT OP AMP
U95	SN74ALS32N	IC,QUAD 2 INPUT OR
VR1	R12-1548-05	RES. SEMI FIXED 3KB
VR2	R12-1548-05	RES. SEMI FIXED 2KB
VR3	R12-2552-05	RES. SEMI FIXED 200B
X1	LTH-0117-05	CERAMIC OSCILLATOR

DCS-9120 STO CPU UNIT

X77-1660-03

REF.NO	PARTS NO	NAME & DESCRIPTION
	KBE-0142-05	IC SOCKET 28P
	P15-0744-05	BLIND PLATE
	J73-0029-22	PCB (UNMOUNTED)
B1	WBD-0408-05	BATTERY,CR2354-LHF
C1	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C2	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C3	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C4	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C5	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C6	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C7	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C8	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C9	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C10	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C11	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C12	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C13	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C14	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C15	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C16	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C17	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C18	CBI-1312-05	CAP. CERAMIC 0.1 80/-20% 50V
C19	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C20	NO USE	
C21	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C22	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C23	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C24	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C25	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C26	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C27	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C28	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C29	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C30	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C31	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C32	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C33	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C37	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C38	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C39	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C40	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C41	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C42	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C43	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C44	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C45	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C46	CBI-1361-08	CAP. MYLAR 0.01 10% 100V
C47	CBI-1361-08	CAP. MYLAR 0.01 10% 100V
C50	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C51	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C52	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C53	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C54	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C55	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C56	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C57	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C58	NO USE	
C59	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C60	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C61	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C62	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C63	CBI-1312-05	CAP. CERAMIC 0.1 80/-20% 50V
C64	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C65	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C66	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C67	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C68	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C69	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C70	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C71	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C72	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C73	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C74	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C75	CBI-1315-05	CAP. CERAMIC 0.1 80/-20% 50V

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
C78	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C79	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C80	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C81	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C82	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C83	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C84	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C85	C91-1315-05	CAP. CERASIC	0.1	80/-20%	50V
C86	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C87	NO USE				
C88	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C89	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C90	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C91	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C92	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C93	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C94	NO USE				
C95	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C101	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C102	C804EK0J103M	CAP. ELECTRO	100	20%	6.3V
C103	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C104	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C105	C804EK1C470M	CAP. ELECTRO	47	20%	16V
C106	C804EK1C470M	CAP. ELECTRO	47	20%	16V
C107	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C108	CE04EK1C470Z	CAP. ELECTRO	47	20%	16V
C109	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C110	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C111	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C112	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C113	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C114	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C115	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C116	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C117	EE04EW1G101S	CAP. ELECTRO	100	20%	16V
C118	EE04EW1G101S	CAP. ELECTRO	100	20%	16V
C119	CE04EW0J251S	CAP. ELECTRO	220	20%	6.3V
C120	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C121	CE04EW1H010S	CAP. ELECTRO	1	20%	50V
C122	CC45CH1H270J	CAP. CERAMIC	27P	5%	50V
C123	CC45CH1H270J	CAP. CERAMIC	27P	5%	50V
C124	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C125	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C126	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C127	CE04EW1C161M	CAP. ELECTRO	160	20%	16V
C128	CC45CH1H270J	CAP. CERAMIC	27P	5%	50V
C129	CC45CH1H070D	CAP. CERAMIC	7P	0.5P	50V
C130	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C131	CQ92A1H102K	CAP. MYLAR	1000P	10%	50V
C132	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C133	C91-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C134	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C135	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C136	NO USE				
C137	CF92A1H474J	CAP. POLYESTER	470UF	5%	50V
C138	NO USE				
C139	CC45SL1H331J	CAP. CERAMIC	330P	5%	50V
C140	CC45SL1H331J	CAP. CERAMIC	330P	5%	50V
C141	CC45CH1H220J	CAP. CERAMIC	22P	5%	50V
D1	MA700	DIODE			
D2	MA700	DIODE			
D3	MA700	DIODE			
D4	NO USE				
D5	1SS132	DIODE			
D6	1SS132	DIODE			
L2	L79-0551-05	FILTER			
L3	L79-0551-05	FILTER			
L4	L40-2281-79	FERRI INDUCTOR	2.2UH	5%	
L5	L40-2201-70	FERRI INDUCTOR	2.2UH	5%	
L6	L40-1021-93	FERRI INDUCTOR	1MH	10%	
L7	L79-0553-05	FILTER			
L8	L40-2201-70	FERRI INDUCTOR	22UH	10%	
P28	E40-7035-05	PIN CONNECTOR	40P		
P50	E40-7226-05	PIN CONNECTOR	64P		
R1	RD14BB2C472J	RES. CARBOV	4.7K	5%	1/6W
R2	RD14BB2C472J	RES. CARBOV	4.7K	5%	1/6W
R3	RD14BB2C472J	RES. CARBOV	4.7K	5%	1/6W
R4	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R5	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R6	R90-0694-05	RES. NETWORK	5X4.7K		
R7	RD14BB2C473J	RES. CARBOV	4.7K	5%	1/6W
R8	RD14BB2C103J	RES. CARBOV	10K	5%	1/6W
R9	RD14BB2C362J	RES. CARBOV	3.6K	5%	1/6W
R10	RD14BB2C152J	RES. CARBOV	1.5K	5%	1/6W
R11	RD14BB2C472J	RES. CARBOV	4.7K	5%	1/6W
R12	RD14BB2C184J	RES. CARBOV	180K	5%	1/6W
R13	RD14BB2C472J	RES. CARBOV	4.7K	5%	1/6W
R14	RD14BB2C103J	RES. CARBOV	10K	5%	1/6W
R15	NO USE				
R16	RN14B32C5101F	RES. METAL FILM	5.1K	1%	1/6W
R17	RN14B32E6209F	RES. METAL FILM	620	1%	1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION			
R18	RD14BB2C113J	RES. CARBON	11K	5%	1/6W
R19	RD14B92E825J	RES. CARBON	8.2K	5%	1/6W
R20	RN14BK2C3901F	RES. METAL FILM	3K	1%	1/6W
R21	RN14BK2C3901F	RES. METAL FILM	3K	1%	1/6W
R22	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R23	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R24	RN14BK2C3601F	RES. METAL FILM	3.6K	1%	1/6W
R25	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R26	RN14BK2C4700F	RES. METAL FILM	470	1%	1/6W
R27	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R28	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R29	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R30	RN14BK2C1002F	RES. METAL FILM	10K	1%	1/6W
R31	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R32	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R33	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R34	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R35	RN14BK2C4701F	RES. METAL FILM	4.7K	1%	1/6W
R36	RD14BB2C182J	RES. CARBON	1K	5%	1/6W
R37	RN14BK2C1602F	RES. METAL FILM	10K	1%	1/6W
R38	RN14BK2C1602F	RES. METAL FILM	10K	1%	1/6W
R39	RN14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R40	RN14BK2C3901F	RES. METAL FILM	3.9K	1%	1/6W
R41	NO USE				
R42	RD14BB2C224J	RES. CARBON	22	5%	1/6W
R43	RK14BK2C1001F	RES. METAL FILM	1K	1%	1/6W
R44	RD14BB2C182J	RES. CARBON	1K	5%	1/6W
R45	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R46	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R47	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R48	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R49	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R50	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R51	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R52	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R53	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R54	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R55	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R56	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R57	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R58	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R59	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R60	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R61	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R62	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R63	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R64	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R65	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R66	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R67	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R68	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R69	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R70	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R71	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R72	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R73	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R74	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R75	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R76	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R77	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R78	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R79	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R80	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R81	RD14BB2C821J	RES. CARBON	220	5%	1/6W
R82	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R83	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R84	RD14B32C221J	RES. CARBON	220	5%	1/6W
R85	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R86	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R87	RD14B32C101J	RES. CARBON	100	5%	1/6W
R88	RD14B32C101J	RES. CARBON	100	5%	1/6W
R89	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R90	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R91	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R92	R92-1460-05	RES. L73000	1.6R	5%	1/6W
R93	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R94	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R95	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R96	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R97	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R98	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R99	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R100	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R101	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R102	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R103	RD14BB2C131J	RES. CARBON	130	5%	1/6W
R104	RD14BB2E2C131J	RES. CARBON	130	5%	1/6W
R105	RD14BB2E2C131J	RES. CARBON	130	5%	1/6W
R106	RD14BB2E2C131J	RES. CARBON	130	5%	1/6W
R107	RD14BB2E2C131J	RES. CARBON	130	5%	1/6W
R108	RD14BB2E2C131J	RES. CARBON	130	5%	1/6W
R109	RD14BB2C751J	RES. CARBON	750	5%	1/6W
R110	RN14BK2C7500F	RES. METAL FILM	750	1%	1/6W
R111	RN14BK2C3901F	RES. METAL FILM	3K	1%	1/6W
R112	RD14BB2C241J	RES. CARBON	240	5%	1/6W
R113	RD14BB2C471J	RES. CARBON	470	5%	1/6W
R114	RD14BB2C471J	RES. CARBON	470	5%	1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R117	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R118	RD14BB2C432J	RES. CARBON	4.3K	5%	1/6W
R119	NO USE				
R120	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R121	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R122	RD14BD2C134J	RES. CARBON	130K	5%	1/6W
R123	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R124	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R125	R90-0586-05	RES. NETWORK	4X4.7K		
R126	RD14BB2C680J	RES. CARBON	68K	5%	1/6W
R127	RD14BB2C681J	RES. CARBON	680	5%	1/6W
R136	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R137	RN14BK2C1003F	RES. METAL FILM	100K	1%	1/6W
R138	NO USE				
R139	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R140	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R141	NO USE				
R142	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R143	R90-1147-05	RES. NETWORK			
R144	R90-1147-05	RES. NETWORK			
R145	R90-1146-05	RES. NETWORK			
R146	R90-1146-05	RES. NETWORK			
R147	R90-1146-05	RES. NETWORK			
R148	R90-1146-05	RES. NETWORK			
R149	RD14BB2C003J	RES. CARBON	3K	5%	1/6W
R150	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R151	RD14BB2C331J	RES. CARBON	330	5%	1/6W
R152	RD14BB2C912J	RES. CARBON	9.1K	5%	1/6W
U1	BP07P2356J-8518	IC,16-BIT CPU			
U2	SN74LS245N	IC,OCTAL BUS TRANSCEIVER(3-S)			
U3	SN74LS245N	IC,OCTAL BUS TRANSCEIVER(3-S)			
U4	SN74ALS541N	IC,OCTAL 3-S BUFFER/LINE DRIVE			
U5	SX744LS374AN	IC,OCTAL D-F.F.			
U6	T93-0809-14	PROGRAMMED ROM			
U7	T93-0810-14	PROGRAMMED ROM			
U8	LC3664ASL-10	IC,CMOS 64K SRAM			
U9	LC3664ASL-10	IC,CMOS 64K SRAM			
U10	MB84256-10LL-SK	IC,S-RAM			
U11	MB84256-10LL-SK	IC,S-RAM			
U12	MB84256-10LL-SK	IC,S-RAM			
U13	MB84256-10LL-SK	IC,S-RAM			
U14	MB84256-10LL-SK	IC,S-RAM			
U15	MB84256-10LL-SK	IC,S-RAM			
U16	SN74ALS244AN	IC,OCTAL BUS BUFFER			
U17	SN74ALS244AN	IC,OCTAL BUS BUFFER			
U18	SN74ALS245AN	IC,OCTAL BUS BUFFER			
U19	LC3664ASL-10	IC,CMOS 64K SRAM			
U20	MC14066BCP	IC,QUAD ANALOG SW/QUAD XPX			
U21	LC3664ASL-10	IC,CMOS 64K SRAM			
U22	LC3664ASL-10	IC,CMOS 64K SRAM			
U23	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U24	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U25	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U26	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U27	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U28	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U29	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U30	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U31	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U32	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U33	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U37	SN74LS283N	IC,4-STATE BINARY COUNTER			
U38	SN74LS283N	IC,4-STATE BINARY COUNTER			
U39	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U40	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX			
U41	SN74ALS352N	IC,DUAL 4-1 DATA SELECT./XPX			
U42	SX74LS374AN	IC,OCTAL D-F.F.			
U43	SN74LS123N	IC,DUAL RONOSTABLE MULTIVIB.			
U44	M3771	IC,RESET			
U50	SN74ALS138N	IC,3-8 DECODER/DE-XPX			
U51	SN74ALS245AN	IC,OCTAL BUS BUFFER			
U52	SN74ALS374AN	IC,OCTAL D-F.F.			
U53	SN74ALS374AN	IC,OCTAL D-F.F.			
U54	SN74ALS374AN	IC,OCTAL D-F.F.			
U55	SN74LS595N	IC,8-BIT SHIFT REGISTERS/LATCH			
U56	SN74LS595N	IC,8-BIT SHIFT REGISTERS/LATCH			
U57	SN74ALS374AN	IC,OCTAL D-F.F.(3-S)			
U58	NO USE				
U59	SN74ALS374AN	IC,OCTAL D-F.F.			
U60	SN74ALS374AN	IC,OCTAL D-F.F.			
U61	SN74ALS374AN	IC,OCTAL D-F.F.			
U62	SN74ALS374AN	IC,OCTAL D-F.F.			
U63	SN74ALS374AN	IC,OCTAL D-F.F.			
U64	SN74ALS374AN	IC,OCTAL D-F.F.			
U65	MC14052BCP	IC,DUAL 4-CH ANALOG MPX/DE-XPX			
U66	MC14052BCP	IC,DUAL 4-CH ANALOG XPX/DE-XPX			
U67	SN74LS365AN	IC,HEX BUS DRIVERS			
U68	DAC08Q8ALCN	IC,8-BIT D/A CONVERTER			
U69	HA17012PD	IC,12-BIT D/A CONVERTER			
U70	HA17012PD	IC,12-BIT D/A CONVERTER			
U71	HA17012PD	IC,12-BIT D/A CONVERTER			
U72	LM6218N	IC,FAST SETTLING DUAL OP-AMP			

REF.NO	PARTS NO	NAME & DESCRIPTION			
U73	XJ3072B8	IC,JFET INPUT OP AMP			
U74	SN74ALS32N	IC,QUAD 2 INPUT OR			
W75	SN74ALS30AN	IC,8-INPUT POSITIVE-NAND GATE			
U78	SN74ALS32N	IC,QUAD 2 INPUT OR			
U79	SN74ALS32N	IC,QUAD 2 INPUT OR			
U80	SN74ALS32N	IC,QUAD 2 INPUT OR			
U81	SN74LS31N	IC,DELAY ELEMENTS			
U82	SN74ALS04BN	IC,HEX INVERTERS			
U83	SN74ALS08N	IC,QUAD 2 INPUT AND GATE			
U84	SN74ALS08N	IC,QUAD 2 INPUT AND GATE			
U85	SX74LS74N	IC,DUAL D-F.F.(WITH PR&CLR)			
U86	SN74ALS32N	IC,QUAD 2 INPUT OR			
U87	NO USE				
U88	SX74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
U89	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
U90	CTM6011	IC,GATE ARRAY			
U91	CTM6021	IC,GATE ARRAY			
U92	CTM6031	IC,GATE ARRAY			
U93	CTM6041	IC,GATE ARRAY			
U94	XJ3072BL	IC,JFET INPUT OP AMP			
U95	SN74ALS32N	IC,QUAD 2 INPUT OR			
VR1	R12-1548-05	RES. SEMI FIXED 2KB			
VR2	R12-1548-05	RES. SEMI FIXED 2KB			
VR3	R12-3552-05	RES. SEMI FIXED 20KB			
X1	L78-0117-05	CERAMIC OSCILLATOR			

DCS-9100 R/O UNIT

X77-1670-01

REF.NO	PARTS NO	NAME & DESCRIPTION			
	E02-0143-05	IC SOCKET	28P		
	F15-0744-05	BLIND PLATE			
	J73-5028-12	PCB (UNPOPULATED)			
B1	M60-0468-05	BATTERY,CR2354-1HF			
C1	CE04EW1C221R	CAP. ELECTRO	220	20%	16V
C2	CE04EW1C221R	CAP. ELECTRO	220	20%	16V
C3	CE04EW1C221R	CAP. ELECTRO	220	20%	16V
C4	CE04EW1C221R	CAP. ELECTRO	220	20%	16V
C5	CE04EW1H010R	CAP. ELECTRO	1	20%	50V
C6	CE04EW1H010R	CAP. ELECTRO	1	20%	50V
C7	CE04EW1C220R	CAP. ELECTRO	22	20%	16V
C8	CE04EW1C220R	CAP. ELECTRO	22	20%	16V
C9	CE04EW1C220R	CAP. ELECTRO	22	20%	16V
C10	CE04EW1C470R	CAP. ELECTRO	47	20%	16V
C11	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C12	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C13	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C14	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C15	C81-1313-05	CAP. CERAMIC	0.1	80/-20%	50V
C16	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C17	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C18	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C19	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C20	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C21	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C22	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C23	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C24	C91-1301-05	CAP. MYLAR	0.01	10%	100V
C25	CC45CH1H101J	CAP. CERAMIC	100P	5%	50V
C26	C91-1301-05	CAP. MYLAR	0.01	10%	100V
C27	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C28	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C29	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C30	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C31	C81-1315-05	CAP. CERAMIC	0.1	80/-20%	50V
C32	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C33	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C34	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C35	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C36	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C37	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C38	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C39	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C40	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C41	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C42	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C43	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C44	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C45	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C46	C91-1337-05	CAP. METALIZED	0.1	10%	100V
C47	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C48	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C49	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C50	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C51	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C52	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C53	C91-1357-05	CAP. METALIZED	0.1	10%	100V
C54	C91-1357-05	CAP. METALIZED	0.1	10%	100V

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
C55	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C56	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C57	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C58	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C59	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C60	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C61	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C62	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C63	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C64	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C65	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C66	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C67	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C68	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C69	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C70	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C71	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C72	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C73	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C74	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C75	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C76	C91-1537-05	CAP. METALIZED 0.1 10% 100V
C77	C91-1537-05	CAP. METALIZED 0.1 10% 100V
C78	C91-1537-05	CAP. METALIZED 0.1 10% 100V
C79	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C80	C91-1367-05	CAP. METALIZED 0.1 10% 100V
C81	C91-1537-05	CAP. METALIZED 0.1 10% 100V
C82	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C83	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C84	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C85	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C86	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C87	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C88	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C89	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C90	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C91	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C92	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C93	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C94	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C95	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C96	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C97	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C98	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C99	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C100	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C101	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C102	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C103	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C104	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C105	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C107	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C108	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C109	C91-1315-06	CAP. CERAMIC 0.1 80/-20% 50V
C110	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C111	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C112	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C113	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C114	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C115	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C116	CQ92M1H153J	CAP. MYLAR 0.015 5% 50V
C117	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C118	C91-1262-06	CAP. NETWORK 1000.01 20% 50V
C119	CC45CH1H561J	CAP. CERAMIC 560P 5% 50V
C120	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C121	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C122	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C123	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C124	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C125	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C126	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C127	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C128	CC45CH1H150J	CAP. CERAMIC 15P 5% 50V
C129	CC45CH1H150J	CAP. CERAMIC 15P 5% 50V
C130	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C131	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C132	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C133	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C134	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C135	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C136	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C137	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C138	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C139	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C140	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C141	CC45CH1H150J	CAP. CERAMIC 15P 5% 50V
C142	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C143	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C144	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C145	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C146	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C147	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C148	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C149	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C150	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C151	CF92V1H273J	CAP. POLYESTER 0.027 5% 50V
C152	C91-1361-05	CAP. MYLAR 0.01 10% 100V

REF.NO	PARTS NO	NAME & DESCRIPTION
C153	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C154	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C155	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C156	CC45SL1H221J	CAP. CERAMIC 220P 5% 50V
C157	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C158	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C159	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C160	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C161	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C162	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C163	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C164	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C165	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C166	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C167	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C168	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C169	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C170	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C171	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C172	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C173	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C174	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C175	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C176	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C177	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C178	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C179	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C180	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C181	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C182	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C183	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C184	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C185	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C186	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C187	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C188	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C189	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C190	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C191	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C192	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C193	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C194	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C195	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C196	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C197	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C198	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C199	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C200	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C201	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C202	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C203	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C204	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C205	CE04EW1H010M	CAP. ELECTRO 1 20% 50V
C206	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C207	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C208	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C209	CQ92W1H273J	CAP. POLYESTER 0.027 5% 50V
C210	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C211	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C212	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C213	CC45CH1H270J	CAP. CERAMIC 27P 5% 50V
C861	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C862	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C863	CQ92M1H473K	CAP. MYLAR 0.047 10% 50V
C864	CC45SL1H331J	CAP. CERAMIC 330P 5% 50V
C865	CC45SL1H471J	CAP. CERAMIC 470P 5% 50V
C901	CC45CH1H470J	CAP. CERAMIC 47P 5% 50V
D1	1SS132	DIODE
D2	1SS132	DIODE
D3	1SS132	DIODE
D4	1SS132	DIODE
D5	1SS132	DIODE
D8	1SS132	DIODE
J1	RX2-1081-05	JUMPING RES. ZERO OHM (5MM)
J2	RX2-1081-05	JUMPING RES. ZERO OHM (5MM)
JP3	RX2-1081-05	JUMPING RES. ZERO OHM (5MM)
JP8	RX2-1081-05	JUMPING RES. ZERO OHM (5MM)
L1	L40-1021-03	FERRI INDUCTOR 1MH 10%
L2	L79-0551-05	FILTER
L3	L79-0551-05	FILTER
L4	L79-0551-05	FILTER
L5	L79-0551-05	FILTER
L6	L40-1021-03	FERRI INDUCTOR 1MH 10%
P27	E40-7386-05	PIN CONNECTOR 20P
P28	E40-7387-05	PIN CONNECTOR 40P
P52	E40-7235-05	PIN CONNECTOR 40P
P53	E40-7236-05	PIN CONNECTOR 64P

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
R1	RD1/4B82C103J	RES. CARBON 10K 5% 1/6W
R2	RD1/4B82C183J	RES. CARBON 18K 5% 1/6W
R3	RD1/4B82C105J	RES. CARBON 1M 5% 1/6W
R4	RD1/4B82C101J	RES. CARBON 100 5% 1/6W
R5	RD1/4B82C103J	RES. CARBON 10K 5% 1/6W
R6	RD1/4B82C103J	RES. CARBON 10K 5% 1/6W
R7	RK1/4B82C152J	RES. CARBON 1.5K 5% 1/6W
R8	RD1/4B82C152J	RES. CARBON 1.5K 5% 1/6W
R9	RD1/4B82C332J	RES. CARBON 3300 5% 1/6W
R10	R90-1125-05	RES. NETWORK 122X10
R11	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R12	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R13	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R14	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R15	RD1/4B82C103J	RES. CARBON 1K 5% 1/6W
R16	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R17	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R18	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R20	RD1/4B82C103J	RES. CARBON 1K 5% 1/6W
R21	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R22	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R23	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R24	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R25	RD1/4B82C103J	RES. CARBON 1K 5% 1/6W
R26	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R27	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R28	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R29	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R30	RD1/4B82C103J	RES. CARBON 1K 5% 1/6W
R31	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R32	RD1/4B82C513J	RES. CARBON 51K 5% 1/6W
R33	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R34	RD1/4B82C104J	RES. CARBON 100K 5% 1/6W
R35	RD1/4B82C102J	RES. CARBON 1K 5% 1/6W
R36	RD1/43B2S62J	RES. CARBOT 5.6K 5% 1/6W
R37	RD1/43B2S62J	RES. CARBOT 5.6K 5% 1/6W
R38	RD1/43B2S62J	RES. CARBOT 5.6K 5% 1/6W
R39	RK1/43B2C100F	RES. METAL FILM 10K 1% 1/6W
R40	RK1/43B2C100F	RES. METAL FILM 10K 1% 1/6W
R41	RK1/43B2C100F	RES. METAL FILM 1K 1% 1/6W
R42	RK1/43B2C100F	RES. METAL FILM 1K 1% 1/6W
R43	RD1/43B2C47J	RES. CARBON 4.7K 5% 1/6W
R44	RD1/43B2C471J	RES. CARBON 470 5% 1/6W
R45	RM1/43B2C1005F	RES. METAL FILM 100K 1% 1/6W
R46	RM1/43B2C1002F	RES. METAL FILM 10K 1% 1/6W
R47	RM1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R48	RM1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R49	RD1/43B2C103J	RES. CARBON 10K 5% 1/6W
R50	RD1/43B2C103J	RES. CARBON 10K 5% 1/6W
R51	RD1/43B2C913J	RES. CARBON 910K 5% 1/6W
R52	RD1/43B2C223J	RES. CARBON 22K 5% 1/6W
R53	RD1/43B2C183J	RES. CARBON 18K 5% 1/6W
R54	RD1/43B2C334J	RES. CARBON 330K 5% 1/6W
R55	RD1/43B2C334J	RES. CARBON 330K 5% 1/6W
R56	RM1/43B2C3001F	RES. METAL FILM 3K 1% 1/6W
R57	RM1/43B2C3001F	RES. METAL FILM 3K 1% 1/6W
R58	RM1/43B2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R59	RM1/43B2C8201F	RES. METAL FILM 8.2K 1% 1/6W
R60	RM1/43B2C3001F	RES. METAL FILM 3K 1% 1/6W
R61	RM1/43B2C3001F	RES. METAL FILM 3K 1% 1/6W
R62	RM1/43B2C1301F	RES. METAL FILM 1.3K 1% 1/6W
R63	RM1/43B2C8201F	RES. METAL FILM 8.2K 1% 1/6W
R64	RM1/43B2C2202F	RES. METAL FILM 22K 1% 1/6W
R65	RM1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R66	RM1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R67	RM1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R68	RD1/43B2C243J	RES. CARBON 240 5% 1/6W
R69	RD1/43B2C102J	RES. CARBON 1K 5% 1/6W
R70	RD1/43B2C102J	RES. CARBON 1K 5% 1/6W
R71	RD1/43B2C105J	RES. CARBON 1M 5% 1/6W
R72	RD1/43B2C202J	RES. CARBON 2K 5% 1/6W
R73	RD1/43B2C102J	RES. CARBON 1K 5% 1/6W
R74	RD1/43B2C104J	RES. CARBON 100K 5% 1/6W
R75	RD1/43B2C104J	RES. CARBON 100K 5% 1/6W
R76	RD1/43B2C104J	RES. CARBON 100K 5% 1/6W
R77	RD1/43B2C104J	RES. CARBON 100K 5% 1/6W
R78	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R79	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R80	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R81	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R82	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R83	RK1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R84	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R85	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R86	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R87	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R88	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R89	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R90	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R91	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R92	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R93	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R94	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R95	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R96	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R97	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION
R98	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R99	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R100	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R101	RK1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R102	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R103	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R104	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R105	RM1/43B2C5001F	RES. METAL FILM 2K 1% 1/6W
R106	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R107	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R108	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R109	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R110	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R111	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R112	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R113	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R114	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R115	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R116	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R117	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R118	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R119	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R120	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R121	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R122	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R123	RK1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R124	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R125	RM1/43B2C1001F	RES. METAL FILM 1K 1% 1/6W
R126	RD1/43B2C101J	RES. CARBON 100 5% 1/6W
R127	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R128	RM1/43B2C2002F	RES. METAL FILM 20K 1% 1/6W
R129	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R130	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R131	RM1/43B2C6200F	RES. METAL FILM 620 1% 1/6W
R132	RM1/43B2C6200F	RES. METAL FILM 620 1% 1/6W
R133	RK1/43B2C1202F	RES. METAL FILM 12K 1% 1/6W
R134	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R135	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R136	RK1/43B2C3302F	RES. METAL FILM 33K 1% 1/6W
R137	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R138	RM1/43B2C2001F	RES. METAL FILM 2K 1% 1/6W
R139	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R140	RM1/43B2C6801F	RES. METAL FILM 6.8K 1% 1/6W
R141	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R142	RM1/43B2C6801F	RES. METAL FILM 6.8K 1% 1/6W
R143	RD1/43B2C683J	RES. CARBON 68K 5% 1/6W
R144	RD1/43B2C221J	RES. CARBON 220 5% 1/6W
R145	RD1/43B2C221J	RES. CARBON 220 5% 1/6W
R146	RD1/43B2C221J	RES. CARBON 220 5% 1/6W
R147	RD1/43B2C105J	RES. CARBON 1M 5% 1/6W
R148	RD1/43B2C105J	RES. CARBON 1M 5% 1/6W
R149	RM1/43B2C2004J	RES. CARBON 200K 5% 1/6W
R150	RD1/43B2C330J	RES. CARBON 33 5% 1/6W
R151	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R152	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R153	RD1/43B2C330J	RES. CARBON 33 5% 1/6W
R154	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R155	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R156	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R157	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R158	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R159	RD1/43B2C330J	RES. CARBON 33 5% 1/6W
R160	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R161	RD1/43B2C330J	RES. CARBON 33 5% 1/6W
R162	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R163	RD1/43B2C330J	RES. CARBON 33 5% 1/6W
R164	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R165	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R166	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R167	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R168	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R169	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R170	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R171	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R172	RD1/43B2C330J	RES. CARBON 33 5% 1/6W
R173	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R174	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R175	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R176	RM1/43B2C1R5J	RES. CARBON 1.5R 5% 1/6W
R177	RD1/43B2C220J	RES. CARBON 22 5% 1/6W
R178	RD1/43B2C330J	RES. CARBON 33K 5% 1/6W
R181	RD1/43B2C154J	RES. CARBON 150K 5% 1/6W
R201	RD1/43B2C333J	RES. CARBON 33K 5% 1/6W
R202	RD1/43B2C274J	RES. CARBON 270K 5% 1/6W
R203	R90-1056-05	
R204	RD1/43B2C301J	RES. CARBON 300 5% 1/6W
R301	RD1/43B2C473J	RES. CARBON 47K 5% 1/6W
R302	RD1/43B2C471J	RES. CARBON 470 5% 1/6W
R303	RD1/43B2C751J	RES. CARBON 750 5% 1/6W
U1	LH0082DP	IC,Z80B CPU
U2	TMS-6808-14	PROGRAMMED ROM
U3	TMS-6784-14	PROGRAMMED ROM
U4	M5M4256-10LL-SK	IC,G-RAM
U5	M5M4128-12LP-S	IC,S-RAM

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
U6	LC5517BS-15	IC,2048X8 STATIC RAM
U7	EPM8610P	IC,CALFKDEN CLOCK
U8	EPM8253C-2	IC,PROGRAMMABLE EXTERNAL TIMER
U9	RTH-5010	IC,GATE ARRAY
U10	HA17012PB	IC,12-BIT D/A CONVERTER
U11	HA17012PB	IC,12-BIT D/A CONVERTER
U12	DAC808BLCN	IC,8-BIT D/A CONVERTER
U13	DAC808BLCN	IC,8-BIT D/A CONVERTER
U14	XC14051BCP	IC,8-CH ANALOG MPX/DE-MPX
U15	XC14051BCP	IC,8-CH ANALOG MPX/DE-MPX
U16	XC14051BCP	IC,8-CH ANALOG MPX/DE-MPX
U17	XC14051BCP	IC,8-CH ANALOG MPX/DE-MPX
U18	XC14051BCP	IC,8-CH ANALOG MPX/DE-MPX
U19	XC14051BCP	IC,8-CE ANALOG MPX/DE-MPX
U20	XC14051BCP	IC,8-CE ANALOG MPX/DE-MPX
U21	XC14051BCP	IC,8-CE ANALOG MPX/DE-MPX
U22	XC14051BCP	IC,8-CH ANALOG MPX/DE-MPX
U23	XC14066BCP	IC,QUAD ANALOG SW/QUAD BPX.
U24	PS5518B	IC,RESET
U25	LM311N	IC,VOLTAGE COMPARATOR
U26	HA17555PS	IC,TIMER
U27	HA17555PE	IC,TIMER
U28	BJH5360	IC,DIAL TIMER
U29	LM324BN	IC,FAST SETTLING DUAL OP-AMP
U30	NJM074D	IC,QUAD JFET INPUT OP AMP
U31	NJM074D	IC,QUAD JFET INPUT OP AMP
U32	NJM074D	IC,QUAD JFET INPUT OP AMP
U33	NJM074D	IC,QUAD JFET INPUT OP AMP
U34	NJM074D	IC,QUAD JFET INPUT OP AMP
U35	NJM074D	IC,QUAD JFET INPUT OP AMP
U36	NJM074D	IC,QUAD JFET INPUT OP AMP
U37	NJM074D	IC,QUAD JFET INPUT OP AMP
U38	SN74ALS139N	IC,DUAL 2-4 DECODER/DE-MPX
U39	SN74ALS174N	IC,HEX D-FFS WITH CLEAR
U40	SN74ALS138N	IC,3-8 DECODER/DE-MPX
U41	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U42	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U43	SN74ALS244AN	IC,OCTAL BUS BUFFER
U44	SN74ALS374AN	IC,OCTAL D-F.F.
U45	SN74ALS174N	IC,HEX D-FFS WITH CLEAR
U46	NO USE	
U47	SN74ALS04BN	IC,HEX INVERTERS
U48	SN74ALS74AN	IC,DUAL D-F.F. (WITH PRSCLR)
U49	SN74ALS27N	IC,TRIPLE 3-INPUT NOR GATE
U50	SN74LS393N	IC,4-STATE BINARY COUNTER
U51	SN74ALS244AN	IC,OCTAL BUS BUFFER
U52	SN74ALS244AN	IC,OCTAL BUS BUFFER
U53	SN74ALS244AN	IC,OCTAL BUS BUFFER
U54	SN74ALS244AN	IC,OCTAL BUS BUFFER
U55	SN74ALS240AN	IC,OCTAL BUS BUFFER
U56	SN74ALS138N	IC,3-8 DECODER/DE-XPX
U57	SN74ALS138N	IC,3-8 DECODER/DE-XPX
U58	SN74ALS138N	IC,3-8 DECODER/DE-XPX
U59	SN74ALS374AN	IC,OCTAL D-F.F.
U60	SN74ALS374AN	IC,OCTAL D-F.F.
U61	SN74ALS374AN	IC,OCTAL D-F.F.
U62	SN74ALS374AN	IC,OCTAL D-F.F.
U63	SN74ALS374AN	IC,OCTAL D-F.F.
U64	SN74LS595N	IC,8-BIT SHIFT REGISTERS/LATCH
U65	SN74LS595N	IC,8-BIT SHIFT REGISTERS/LATCH
U66	SN74LS133N	IC,DUAL MONOSTABLE MULTIVIB.
U67	TC74HC08AP	IC,QUAD 2-INPUT AND GATE
U68	TC74HC86AP	IC,QUAD EXCLUSIVE OR GATE
U69	TC74HC08AP	IC,QUAD 2-INPUT AND GATE
U70	TC74HC86AP	IC,QUAD EXCLUSIVE OR GATE
U71	TC74HC08AP	IC,QUAD 2-INPUT AND GATE
U72	TC74HC86AP	IC,QUAD EXCLUSIVE OR GATE
U73	SN74LS107AN	IC,DUAL J-K F.F. WITH CLEAR
U74	SN74LS107AN	IC,DUAL J-K F.F. WITH CLEAR
U75	SN74LS107AN	IC,QUAL J-K F.F. WITH CLEAR
U76	SN74LS107AN	IC,DUAL J-K F.F. WITH CLEAR
U77	SN74ALS30AN	IC,8-INPUT POSITIVE-NAND GATE
U78	SN74ALS30AN	IC,8-INPUT POSITIVE-NAND GATE
U79	SN74ALS138N	IC,3-8 DECODER/DE-MPX
U80	SN74LS31N	IC,DELAY ELEMENTS
U81	SN74ALS04BN	IC,HEX INVERTERS
U82	SN74LS393N	IC,4-STATE BINARY COUNTER
U83	SN74LS393N	IC,4-STATE BINARY COUNTER
U84	SN74LS393N	IC,4-STATE BINARY COUNTER
U85	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
U86	SN74ALS688N	IC,8-BIT MAGNITUDE COMPARATORS
U87	SN74ALS74AN	IC,DUAL D-F.F. (WITH PRSCLR)
U88	SN74LS123N	IC,DUAL MONOSTABLE MULTIVIB.
U89	SN74ALS04BN	IC,HEX INVERTERS
U90	SN74ALS08N	IC,QUAD 2 INPUT AND GATE
U91	SN74ALS08N	IC,QUAD 2 INPUT AND GATE
U92	SN74ALS32N	IC,QUAD 2 INPUT OR
U93	SN74ALS32N	IC,QUAD 2 INPUT OR
U94	SN74ALS00AN	IC,QUAD 2 INPUT NAND GATE
U95	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./XPX
U96	TC74HC04AP	IC,HEX INVERTER
X1	L78-0118-05	CERAMIC OSCILLATOR
X2	L78-0118-05	CERAMIC OSCILLATOR
X3	L77-1229-05	CRYSTAL RESONATOR

DCS-9120 R/O UNIT

X77-1670-03

	R02-0143-05	IC SOCKET 28P
	P10-0744-05	BLIND PLATE
	J7A-0028-12	PCB (UNMOUNTED)
B1	A99-0408-05	BATTERY,CR2354-3PF
C1	CE04FW1C2231	CAP. ELECTRO 220 20% 16V
C2	CE04FW1C2231	CAP. ELECTRO 220 20% 16V
C3	CE04FW1C2231	CAP. ELECTRO 220 20% 16V
C4	CE04FW1C221X	CAP. ELECTRO 220 20% 16V
C5	CE04EW1H010M	CAP. ELECTRO 1 20% 50V
C6	CE04FW1B010M	CAP. ELECTRO 1 20% 50V
C7	CE04FW1C220M	CAP. ELECTRO 22 20% 16V
C8	CE04FW1C220M	CAP. ELECTRO 22 20% 16V
C9	CE04FW1C220M	CAP. ELECTRO 22 20% 16V
C10	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C11	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C12	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C13	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C14	CC45CH1H103J	CAP. CERAMIC 100P 5% 50V
C15	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C16	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C17	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C18	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C19	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C20	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C21	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C22	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C23	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C24	C81-1361-05	CAP. MYLAR 0.01 10% 100V
C25	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C26	C81-1361-05	CAP. MYLAR 0.01 10% 100V
C27	C81-1361-05	CAP. MYLAR 0.01 10% 100V
C28	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C29	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C30	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C31	C81-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C32	C81-1537-05	CAP. METALIZED 0.1 10% 100V
C33	C81-1537-05	CAP. METALIZED 0.1 10% 100V
C34	C81-1537-05	CAP. METALIZED 0.1 10% 100V
C35	C81-1537-05	CAP. METALIZED 0.1 10% 100V
C36	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C37	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C38	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C39	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C40	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C41	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C42	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C43	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C44	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C45	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C46	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C47	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C48	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C49	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C50	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C51	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C52	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C53	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C54	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C55	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C56	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C57	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C58	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C59	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C60	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C61	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C62	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C63	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C64	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C65	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C66	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C67	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C68	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C69	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C70	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C71	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C72	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C73	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C74	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C75	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C76	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C77	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C78	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C79	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C80	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C81	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C82	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C83	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C84	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C85	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C86	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C87	C81-1357-05	CAP. METALIZED 0.1 10% 100V
C88	C81-1357-05	CAP. METALIZED 0.1 10% 100V

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
C89	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C90	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C91	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C92	C91-1357-05	CAP. METALIZED 0.1 10% 100V
C93	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C94	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C95	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C96	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C97	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C98	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C99	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C100	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C101	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C102	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C103	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C104	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C105	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C106	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C107	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C108	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C109	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C110	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C111	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C112	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C113	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C114	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C115	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C116	CQ92MH153J	CAP. MYLAR 0.015 5% 50V
C117	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C118	C91-1362-05	CAP. NETWORK 1616.01 20% 50V
C119	CC45CH1H560J	CAP. CERAMIC 56P 5% 50V
C120	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C121	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C122	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C123	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C124	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C125	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C126	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C127	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C128	CC45CH1H150J	CAP. CERAMIC 15P 5% 50V
C129	CC45CH1H150J	CAP. CERAMIC 15P 5% 50V
C130	C91-1381-05	CAP. MYLAR 0.01 10% 100V
C131	C91-1381-05	CAP. MYLAR 0.01 10% 100V
C132	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C133	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C134	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C135	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C136	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C137	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C138	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C139	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C140	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C141	CC45CH1H560J	CAP. CERAMIC 56P 5% 50V
C142	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C143	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C144	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C145	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C146	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C147	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C148	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C149	C91-1313-05	CAP. CERAMIC 0.1 80/-20% 50V
C150	CK45B1H102K	CAP. CERAMIC 1000P 10% 50V
C151	CF227H1J273J	CAP. POLYESTER 0.027 5% 50V
C152	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C153	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C154	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C155	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C156	CC45SL1H221J	CAP. CERAMIC 220P 5% 50V
C157	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C158	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C159	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C160	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C161	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C162	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C163	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C164	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C165	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C166	C91-1313-05	CAP. CERAMIC 0.1 80/-20% 50V
C167	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C168	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C188	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C189	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C191	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C192	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C193	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C194	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C195	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C196	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C197	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C198	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C199	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C200	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C201	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C202	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C203	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C204	C91-1361-05	CAP. MYLAR 0.01 10% 100V

REF.NO	PARTS NO	NAME & DESCRIPTION
C205	CE44EW1H010K	CAP. ELECTRO 1 20% 50V
C206	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C207	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C208	C91-1315-05	CAP. CERAMIC 0.1 80/-20% 50V
C209	CF92E1J827J	CAP. POLYESTER 0.027 5% 50V
C210	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C211	C91-1361-05	CAP. MYLAR 0.01 10% 100V
C212	CC45CH1H101J	CAP. CERAMIC 100P 5% 50V
C213	CC45CH1J270J	CAP. CERAMIC 27P 5% 50V
C801	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C802	C91-0769-05	CAP. CERAMIC 0.01 20% 16V
C803	CQ92E1H473K	CAP. MYLAR 0.047 10% 50V
C804	CC45SL1H331J	CAP. CERAMIC 330P 5% 50V
C805	CC45SL1H471J	CAP. CERAMIC 470P 5% 50V
C901	CC45CH1H470J	CAP. CERAMIC 47P 5% 50V
D1	1SS132	DIODE
D2	1SS132	DIODE
D3	1SS132	DIODE
D4	1SS132	DIODE
D5	1SS132	DIODE
D6	1SS132	DIODE
J1	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
J2	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
J3	NO USE	
JP4	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
JP5	NO USE	
JP6	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
L1	L49-1021-03	FERRI INDUCTOR 1MH 10%
L2	L79-0531-05	FILTER
L3	L79-0531-05	FILTER
L4	L79-0531-05	FILTER
L5	L79-0531-05	FILTER
L6	L49-1021-03	FERRI INDUCTOR 1MH 10%
P27	E40-7398-05	PIN CONNECTOR 28P
P28	E40-7397-05	PIN CONNECTOR 40P
P53	E40-7035-05	PIN CONNECTOR 40P
P55	E40-7226-05	PIN CONNECTOR 84P
R1	RD14B8E1C103J	RES. CARBON 10K 5% 1/6W
R2	RD14B8E1C103J	RES. CARBON 10K 5% 1/6W
R3	RD14B8E1C103J	RES. CARBON 10K 5% 1/6W
R4	RD14B8E2H101J	RES. CARBON 100 5% 1/6W
R5	RD14B8E1C103J	RES. CARBON 10K 5% 1/6W
R6	RD14B8E1C103J	RES. CARBON 10K 5% 1/6W
R7	RD14B8E2C152J	RES. CARBON 1.5K 5% 1/6W
R8	RD14B8E2C152J	RES. CARBON 1.5K 5% 1/6W
R9	RD14B8E2C134J	RES. CARBON 130K 5% 1/6W
R10	RK98-1126-05	RES. NETWORK 123X1M
R11	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R12	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R13	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R14	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R15	RD14B8E2C102J	RES. CARBON 1K 5% 1/6W
R16	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R17	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R18	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R19	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R20	RD14B8E2C102J	RES. CARBON 1K 5% 1/6W
R21	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R22	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R23	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R24	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R25	RD14B8E2C102J	RES. CARBON 1K 5% 1/6W
R26	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R27	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R28	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R29	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R30	RD14B8E1C102J	RES. CARBON 1K 5% 1/6W
R31	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R32	RD14B8E2C513J	RES. CARBON 51K 5% 1/6W
R33	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R34	RD14B8E2C104J	RES. CARBON 100K 5% 1/6W
R35	RD14B8E1C102J	RES. CARBON 1K 5% 1/6W
R36	RD14B8E2C562J	RES. CARBON 5.6K 5% 1/6W
R37	RD14B8E2C562J	RES. CARBON 5.6K 5% 1/6W
R38	RD14B8E2C562J	RES. CARBON 5.6K 5% 1/6W
R39	RN14B8E2C1002F	RES. METAL FILM 10K 1% 1/6W
R40	RN14B8E2C1002F	RES. METAL FILM 10K 1% 1/6W
R41	RS14B8E2C1001F	RES. METAL FILM 1K 1% 1/6W
R42	RN14B8E2C1001F	RES. METAL FILM 1K 1% 1/6W
R43	RD14B8E2C472J	RES. CARBON 4.7K 5% 1/6W
R44	RD14B8E2C471J	RES. CARBON 470 5% 1/6W
R45	RN14B8E2C1002F	RES. METAL FILM 10K 1% 1/6W
R46	RN14B8E2C1002F	RES. METAL FILM 10K 1% 1/6W
R47	RN14B8E2C1001F	RES. METAL FILM 1K 1% 1/6W
R48	RN14B8E2C1001F	RES. METAL FILM 1K 1% 1/6W
R49	RD14B8E2C103J	RES. CARBON 10K 5% 1/6W
R50	RD14B8E2C914J	RES. CARBON 910K 5% 1/6W
R51	RD14B8E2C103J	RES. CARBON 10K 5% 1/6W
R52	RD14B8E2C220J	RES. CARBON 22 5% 1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R54	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R54	RD14BB2C334J	RES. CARBON	330K	5%	1/6W
R55	RD14BB2C334J	RES. CARBON	330K	5%	1/6W
R56	RN14BB2C3001F	RES. METAL FILM	3K	1%	1/6W
R57	RN14BB2C3001F	RES. METAL FILM	2K	1%	1/6W
R58	RN14BB2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R59	RX14BX2CB2R7F	RES. METAL FILM	8.2R	1%	1/6W
R60	RN14BB2C3501F	RES. METAL FILM	3K	1%	1/6W
R61	RN14BB2C3001F	RES. METAL FILM	3K	1%	1/6W
R62	RN14BB2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R63	RN14BB2C8201F	RES. METAL FILM	8.2K	1%	1/6W
R64	RN14BB2C2202F	RES. METAL FILM	22K	1%	1/6W
R65	RN14BB2C1001F	RES. METAL FILM	1K	1%	1/6W
R66	RN14BB2C1001F	RES. METAL FILM	1K	1%	1/6W
R67	RN14BB2C2202F	RES. METAL FILM	22K	1%	1/6W
R68	RD14BB2C242J	RES. CARBON	2.4K	5%	1/6W
R69	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R70	RD14BB2C103J	RES. CARBON	1M	5%	1/6W
R71	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R72	RD14BB2C202J	RES. CARBON	2K	5%	1/6W
R73	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R74	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R75	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R76	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R77	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R78	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R79	RN14BB2C8201F	RES. METAL FILM	8.2K	1%	1/6W
R80	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R81	RN14BB2C8201F	RES. METAL FILM	2K	1%	1/6W
R82	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R83	RN14BB2C8201F	RES. METAL FILM	2K	1%	1/6W
R84	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R85	RN14BB2C8201F	RES. METAL FILM	2K	1%	1/6W
R86	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R87	RN14BB2C8201F	RES. METAL FILM	2K	1%	1/6W
R88	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R89	RN14BB2C2001F	RES. METAL FILM	2K	1%	1/6W
R90	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R91	RN14BB2C8201F	RES. METAL FILM	2K	1%	1/6W
R92	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R93	RN14BB2C2001F	RES. METAL FILM	2K	1%	1/6W
R94	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R95	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R96	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R97	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R98	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R100	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R101	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R101	RN14BX2C8201F	RES. METAL FILM	2K	1%	1/6W
R102	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R103	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R104	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R105	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R106	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R107	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R108	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R109	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R110	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R111	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R112	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R113	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R114	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R115	RN14BB2C2001F	RES. METAL FILM	2K	1%	1/6W
R116	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R117	RN14BB2C2001F	RES. METAL FILM	2K	1%	1/6W
R118	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R119	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R120	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R121	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R122	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R123	RN14BB2C1001F	RES. METAL FILM	1K	1%	1/6W
R124	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R125	RN14BX2C1001F	RES. METAL FILM	1K	1%	1/6W
R126	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R127	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R128	RN14BX5E2009F	RES. METAL FILM	200	1%	1/6W
R129	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R130	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R131	RN14BX5E2009F	RES. METAL FILM	200	1%	1/6W
R132	RN14BX2GE200F	RES. METAL FILM	820	1%	1/6W
R133	RN14BX2C1202F	RES. METAL FILM	12K	1%	1/6W
R134	RN14BX5E2009F	RES. METAL FILM	200	1%	1/6W
R135	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R136	RN14BX2C3302F	RES. METAL FILM	33K	1%	1/6W
R137	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R138	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R139	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R140	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R141	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R142	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R143	RD14BB3C683J	RES. CARBON	68K	5%	1/6W
R144	RD14BB2C223J	RES. CARBON	220	5%	1/6W
R145	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R146	RD14BB2C221J	RES. CARBON	220	5%	1/6W
R147	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R148	RD14BB2C105J	RES. CARBON	1M	5%	1/6W
R149	RD14BB2G204J	RES. CARBON	200K	5%	1/8W
R150	RD14BB2C220J	RES. CARBON	22	5%	1/6W

REF.NO	PARTS NO	NAME & DESCRIPTION			
R151	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R152	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R153	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R154	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R155	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R156	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R157	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R158	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R159	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R160	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R161	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R162	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R163	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R164	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R165	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R166	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R167	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R168	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R169	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R170	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R171	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R172	RD14BB3C220J	RES. CARBON	22	5%	1/6W
R173	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R174	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R175	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R176	RD14BB2C162J	RES. CARBON	1.5K	5%	1/6W
R177	RD14BB2C82CJ	RES. CARBON	820	5%	1/6W
R178	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R181	RD14BB2C184J	RES. CARBON	180K	5%	1/6W
R891	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R892	RD14BB3C274J	RES. CARBON	270K	5%	1/6W
R893	NO USE				
R894	RD14BB2C301J	RES. CARBON	300	5%	1/8W
R901	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R902	RD14BB2C471J	RES. CARBON	470	5%	1/8W
R903	RD14BB3C751J	RES. CARBON	750	5%	1/8W
C1	LX00805F	IC,Z80D CPU			
C2	T05-0406-14	PROGRAMMED ROM			
C3	T05-0794-14	PROGRAMMED ROM			
C4	HM4256-10LL-SB	IC,S-RAM			
C5	HM4424-12LP-6	IC,S-RAM			
C6	LC5317BS-15	IC,512*8 STATIC RAM			
C7	BU5416F	IC,CALENDER CLOCK			
C8	MPD8253C-2	IC,PROGRAMMABLE INTERVAL TIMER			
C9	X7M-5000	IC,CLOCK GENERT			
C10	BA17012FS	IC,12-BIT D/A CONVERTER			
C11	BA17012FS	IC,12-BIT D/A CONVERTER			
C12	6AC80A1CW	IC,8-BIT D/A CONVERTER			
C13	6AC80A1CW	IC,8-BIT D/A CONVERTER			
C14	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C15	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C16	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C17	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C18	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C19	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C20	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C21	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C22	XC14C51BCP	IC,8-CH ANALOG MPX/DE-MPX			
C23	XC14C08CP	IC,QUAD ANALOG SW/QUAD MPX			
C24	RST5188	IC,RESET			
C25	LX5118	IC,VOLTAGE COMPARATOR			
C26	HA17555PS	IC,TIMER			
C27	HA17555PS	IC,TIMER			
C28	HD63568	IC,DUAL TIMER			
C29	LM6218N	IC,FAST SETTLING DUAL OP-AMP			
C30	NJM074D	IC,QUAD JFET INPUT OP AMP			
C31	NJM074D	IC,QUAD JFET INPUT OP AMP			
C32	NJM074D	IC,QUAD JFET INPUT OP AMP			
C33	NJM074D	IC,QUAD JFET INPUT OP AMP			
C34	NJM074D	IC,QUAD JFET INPUT OP AMP			
C35	NJM074D	IC,QUAD JFET INPUT OP AMP			
C36	NJM074D	IC,QUAD JFET INPUT OP AMP			
C37	NJM074D	IC,QUAD JFET INPUT OP AMP			
C38	SN74ALS138N	IC,DUAL 2-4 DECODER/DE-MPX			
C39	SN74ALS174N	IC,HEX D-FFS WITH CLEAR			
C40	SN74ALS139N	IC,DUAL 2-4 DECODER/DE-MPX			
C41	SN74ALS157AJ	IC,QUAD 2-1 DATA SELECT,/MPX			
C42	SN74ALS157AJ	IC,QUAD 2-1 DATA SELECT,/MPX			
C43	SN74ALS244BN	IC,OCTAL BUS BUFFER			
C44	SN74ALS374AN	IC,OCTAL D-F.F.			
C45	SN74ALS174N	IC,HEX D-FFS WITH CLEAR			
C46	NO USE				
C47	SN74ALS04BN	IC,HEX INVERTERS			
C48	SN74ALS74AN	IC,DUAL D-F.F. (WITH PR&CLR)			
C49	SN74ALS27N	IC,TRIPPLE 3-INPUT NOR GATE			
C50	SN74ALS393N	IC,4-STATE BINARY COUNTER			
C51	SN74ALS244BN	IC,OCTAL BUS BUFFER			
C52	SN74ALS244BN	IC,OCTAL BUS BUFFER			
C53	SN74ALS244BN	IC,OCTAL BUS BUFFER			
C54	SN74ALS244BN	IC,OCTAL BUS BUFFER			
C55	SN74ALS244BN	IC,OCTAL BUS BUFFER			
C56	SN74ALS138N	IC,3-8 DECODER/DE-MPX			
C57	SN74ALS138N	IC,3-8 DECODER/DE-MPX			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
058	SN74ALS138N	IC,3-8 DECODER/DE-MPX
059	SN74ALS374AN	IC,OCTAL D-F.F
060	SN74ALS574AN	IC,OCTAL D-F.F.
061	SN74ALS374AN	IC,OCTAL D-F.F.
062	SN74ALS374AN	IC,OCTAL D-F.F.
063	SN74ALS374AN	IC,OCTAL D-F.F.
064	SN74LS595N	IC,8-BIT SHIFT REGISTERS/LATCH
065	SN74LS598N	IC,8-BIT SHIFT REGISTERS/LATCH
066	SN74LS123N	IC,DUAL XONOSTABLE MULTIVIB.
067	TC74XC08AP	IC,QUAD 2-INPUT AND GATE
068	TC74XC86AP	IC,QUAD EXCLUSIVE OR GATE
069	TC74XC08AP	IC,QUAD 2-INPUT AND GATE
070	TC74XC86AP	IC,QUAD EXCLUSIVE OR GATE
071	TC74XC08AP	IC,QUAD 2-INPUT AND GATE
072	TC74XC86AP	IC,QUAD EXCLUSIVE OR GATE
073	SN74LS107AN	IC,DKAL J-K F.F. WITH CLEAR
074	SN74LS107AN	IC,DKAL J-K F.F. WITH CLEAR
075	SN74LS107AN	IC,DKAL J-K F.F. WITH CLEAR
076	SN74LS107AN	IC,DKAL J-K F.F. WITH CLEAR
077	SN74ALS30AN	IC,8-INPUT POSITIVE-KAND GATE
078	SN74ALS30AN	IC,8-INPUT POSITIVE-KAND GATE
079	SN74ALS138N	IC,3-8 DECODER/DE-MPX
080	SN74LS32N	IC,DELAY ELEMENTS
081	SN74ALS04BN	IC,HEX INVERTERS
082	SN74LS393N	IC,4-STATE BINARY COUNTER
083	SN74LS393N	IC,4-STATE BINARY COUNTER
084	SN74LS393N	IC,4-STATE BINARY COUNTER
085	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
086	SN74ALS668N	IC,8-BIT MAGNITUDE COMPARATORS
087	SN74ALS74AN	IC,DKAL D-F.F. (WITH PRACLR)
088	SN74LS123N	IC,DUAL XONOSTABLE MULTIVIB.
089	SN74ALS640N	IC,BUS DRIVERS
090	SN74ALS08N	IC,QUAD 2 INPUT AND GATE
091	SN74ALS08N	IC,QUAD 2 INPUT AND GATE
092	SN74ALS32N	IC,QUAD 2 INPUT OR
093	SN74ALS32N	IC,QUAD 2 INPUT OR
094	SN74ALS00AN	IC,QUAD 2 INPUT XNAND GATE
095	SN74ALS157AN	IC,QUAD 2-1 DATA SELECT./MPX
096	TC74HCT04AP	IC,HEX INVERTER
J1	L78-0119-05	CERAMIC OSCILLATOR
J2	L78-0118-05	CERAMIC OSCILLATOR
J3	L77-1238-05	CRYSTAL RESONATOR

A/D UNIT

X78-1070-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	J73-0035-13	PCB (UNMOUNTED)
C101	CE04KW1C470M	CAP. ELECTRO 47 20% 16V
C102	CE04KW1C470M	CAP. ELECTRO 47 20% 16V
C103	CG73FCH1H103J	CAP. CERAMIC 100P 5% 50V
C104	CG73FCH1H103J	CAP. CERAMIC 100P 5% 50V
C105	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C106	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C107	CK73BF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C108	CG73FCH1H103J	CAP. CERAMIC 100P 5% 50V
C109	CK73BF1H105K	CAP. CERAMIC 1000P 10% 50V
C110	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C111	NO USE	
C112	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C113	NO USE	
C114	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C115	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C118	CK73FB1E102K	CAP. CERASIC 1000P 10% 50V
C121	CK73FF1H104Z	CAP. CERSNIC 0.1 20/-20% 50V
C122	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C129	CG73FCH1H151J	CAP. CERAMIC 150P 5% 50V
C201	CE04KW1C470M	CAP. ELECTRO 47 20% 16V
C202	CE04KW1C470M	CAP. ELECTRO 47 20% 16V
C203	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C204	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C205	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C206	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C207	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C208	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C209	CK73FB1H102K	CAP. CERAMIC 1000P 10% 50V
C210	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C211	NO USE	
C212	CG73FCH1H101J	CAP. CERAMIC 100P 5% 50V
C213	NO USE	
C214	CG73SCH1H101J	CAP. CERAMIC 100P 5% 50V
C215	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C218	CK73FB1H102K	CAP. CERAMIC 1000P 10% 50V
C221	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C222	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V

REF.NO	PARTS NO	NAME & DESCRIPTION
C229	CC73FCH1H151J	CAP. CERAMIC 150P 5% 50V
C301	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C302	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C303	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C304	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C305	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C306	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C307	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C508	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C509	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C510	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C511	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C512	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C513	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C514	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C515	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C516	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C517	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C518	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C519	CK04FW1C470M	CAP. ELECTRO 47 20% 16V
C520	CK04FW1C470M	CAP. ELECTRO 47 20% 16V
C521	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C522	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C523	CE04EW1C470M	CAP. ELECTRO 47 20% 16V
C801	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C802	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C803	CC45CH1H010C	CAP. CERAMIC 1P 0.25P 50V
C804	CC45CH1H020C	CAP. CERAMIC 2P 0.25P 50V
C805	CC45SL1H681J	CAP. CERAMIC 680P 5% 50V
C812	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C822	CK73FF1H104Z	CAP. CERAMIC 0.1 20/-20% 50V
C827	CC73FCH1H121J	CAP. CERAMIC 120P 5% 50V
C828	CC73FCH1H121J	CAP. CERAMIC 120P 5% 50V
C833	CC73FCH1E681J	CAP. CERAMIC 680P 5% 50V
C834	CC73FCH1E681J	CAP. CERAMIC 680P 5% 50V
D101	1A704	DIODE
D102	1A704	DIODE
D103	NO USE	
D104	1SS187	DIODE
D201	MA704	DIODE
D202	MA784	DIODE
D203	NO USE	
D204	1SS187	DIODE
J1	E23-0503-05	TEST PIN
J2	E23-0503-05	TEST PIN
J3	E23-0503-05	TEST PIN
J4	E23-0503-05	TEST PIN
J5	NO USE	
J6	E23-0503-05	TEST PIN
J7	E23-0503-05	TEST PIN
J8	E23-0503-05	TEST PIN
J9	E23-0503-05	TEST PIN
J10	E23-0503-05	TEST PIN
J11	E23-0503-05	TEST PIN
J12	E23-0503-05	TEST PIN
J13	E23-0503-05	TEST PIN
L101	L79-0555-05	FILTER
L102	L79-0555-05	FILTER
L105	L79-0553-05	FILTER
L106	L79-0553-05	FILTER
L201	L79-0553-05	FILTER
L202	L79-0553-05	FILTER
L205	L79-0553-05	FILTER
L206	L79-0553-05	FILTER
L301	L79-0553-05	FILTER
L302	L79-0553-05	FILTER
L303	L79-0553-05	FILTER
P1	E40-3237-05	PIN CONNECTOR 2P
P2	E40-3237-05	PIN CONNECTOR 2P
P30	E39-7237-05	PIN CONNECTOR 20P
P31	E40-7227-05	PIN CONNECTOR 20P
P36	E40-7228-05	PIN CONNECTOR 20P
P57	E40-7238-05	PIN CONNECTOR 20P
Q102	2SA1462(Y34)	TR. SI. PNP
Q202	2SA1462(Y34)	TR. SI. PNP

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R101	R473ER2B101J	RES. METALGLACE 100	5%	1/8W	
R102	R473ER2B100J	RES. METALGLACE 10	5%	1/8W	
R103	R473ER2B100J	RES. METALGLACE 10	5%	1/8W	
R104	R473ER2B364J	RES. METALGLACE 360K	5%	1/8W	
R105	R473KB2B510J	RES. METALGLACE 51	5%	1/8W	
R106	R473KB2B331J	RES. METALGLACE 330	5%	1/8W	
R107	R473ER2B33J	RES. METALGLACE 33Ω	5%	1/8W	
R108	R99-1128-05	RES. NETWORK 4X820			
R109	R99-1128-05	RES. NETWORK 4X820			
R110	R473ER2B391J	RES. METALGLACE 390	5%	1/8W	
R111	R473ER2B391J	RES. METALGLACE 390	5%	1/8W	
R112	R473ER2B101J	RES. METALGLACE 100	5%	1/8W	
R113	R473ER2B101J	RES. METALGLACE 100	5%	1/8W	
R114	R473ER2B121J	RES. METALGLACE 120	5%	1/8W	
R118	R473ER2A220J	RES. METALGLACE 22	5%	1/8W	
R119	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R120	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R121	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R122	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R123	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R124	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R125	R473ER2B82J	RES. METALGLACE 82	5%	1/8W	
R126	R473ER2B750J	RES. METALGLACE 750	5%	1/8W	
R127	R473ER2B33J2J	RES. METALGLACE 3.3R	5%	1/8W	
R128	R473ER2B68J	RES. METALGLACE 680	5%	1/8W	
R201	R473ER2B101J	RES. METALGLACE 100	5%	1/8W	
R202	R473ER2B100J	RES. METALGLACE 10	5%	1/8W	
R203	R473ER2B100J	RES. METALGLACE 10	5%	1/8W	
R204	R473KB2B364J	RES. METALGLACE 360K	5%	1/8W	
R205	R473ER2B51J	RES. METALGLACE 51	5%	1/8W	
R206	R473KB2B331J	RES. METALGLACE 330	5%	1/8W	
R207	R473ER2B331J	RES. METALGLACE 330	5%	1/8W	
R208	R99-1128-05	RES. NETWORK 4X820			
R209	R99-1128-05	RES. NETWORK 4X820			
R210	R473ER2B391J	RES. METALGLACE 390	5%	1/8W	
R211	R473ER2B391J	RES. METALGLACE 390	5%	1/8W	
R212	R473ER2B101J	RES. METALGLACE 100	5%	1/8W	
R213	R473ER2B101J	RES. METALGLACE 100	5%	1/8W	
R214	R473ER2B121J	RES. METALGLACE 120	5%	1/8W	
R218	R473ER2A220J	RES. METALGLACE 22	5%	1/8W	
R219	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R220	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R221	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R222	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R223	R473ER2B220J	RES. METALGLACE 22	5%	1/8W	
R224	R473KB2B220J	RES. METALGLACE 22	5%	1/8W	
R225	R473KB2B220J	RES. METALGLACE 22	5%	1/8W	
R226	R473ER2B750J	RES. METALGLACE 750	5%	1/8W	
R227	R473ER2B33J2J	RES. METALGLACE 3.3R	5%	1/8W	
R228	R473ER2B68J	RES. METALGLACE 680	5%	1/8W	
R821	R473ER2B150J	RES. METALGLACE 15	5%	1/8W	
R822	R473ER2B150J	RES. METALGLACE 15	5%	1/8W	
TC101	C05-0473-05	CAP. CERAMIC 120P			
TC102	C05-0473-05	CAP. CERAMIC 120P			
TC201	C05-0473-05	CAP. CERAMIC 120P			
TC202	C05-0473-05	CAP. CERAMIC 120P			
U1	MC10H116J	IC,TRIPLE LINE RECEIVER			
U101	KMC09	IC,LINEAR			
U102	CXA1396D	IC,A/D CONVERTER			
U103	MC10H125R	IC,QUAD TTL TO MECL TRANSLATOR			
U104	MC10H125R	IC,QUAD TTL TO MECL TRANSLATOR			
U105	DTM6018	IC,GATE ARRAY			
U106	CXK5863M-25	IC,S-RAM			
U107	CXK5863M-25	IC,S-RAM			
U108	CXK5863M-25	IC,S-RAM			
U109	CXK5863M-25	IC,S-RAM			
U201	KMC09	IC,LINEAR			
U202	CXA1396D	IC,A/D CONVERTER			
U203	MC10H125R	IC,QUAD TTL TO MECL TRANSLATOR			
U204	MC10H125R	IC,QUAD TTL TO MECL TRANSLATOR			
U205	DTM6018	IC,GATE ARRAY			
U206	CXK5863M-25	IC,S-RAM			
U207	CXK5863M-25	IC,S-RAM			
U208	CXK5863M-25	IC,S-RAM			
U209	CXK5863M-25	IC,S-RAM			
VR101	R12-1529-05	RES. SEMI FIXED 2Ω			
VR201	R12-1529-05	RES. SEMI FIXED 2Ω			

GP-IB UNIT

X79-1120-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	J73-0027-12	PCB (UNMOUNTED)			
SZ101	T90-0805-05	BUZZER			
C1	C90-3080-05	CAP. ELECTRO 2200	20%	16V	
C2	C90-3060-05	CAP. ELECTRO 2200	20%	10V	
C3	C90-3060-05	CAP. ELECTRO 2200	20%	16V	
C4	C90-3060-05	CAP. ELECTRO 2200	20%	16V	
C5	C90-3058-05	CAP. ELECTRO 1000	20%	25V	
C6	C90-3059-05	CAP. ELECTRO 1000	20%	25V	
C7	C90-3059-05	CAP. ELECTRO 1000	20%	25V	
C8	C90-3059-05	CAP. ELECTRO 1000	20%	25V	
C9	C90-3059-05	CAP. ELECTRO 1000	20%	25V	
C10	C90-3059-05	CAP. ELECTRO 1000	20%	25V	
C11	C90-3061-05	CAP. ELECTRO 68	1%	100V	
C12	C90-3061-05	CAP. ELECTRO 68	1%	100V	
C13	CE04WE1C100M	CAP. ELECTRO 10	20%	250V	
C14	CE04WE2C100M	CAP. ELECTRO 10	20%	200V	
C15	CE04EW1E101M	CAP. ELECTRO 100	20%	25V	
C101	CE04EW1C220K	CAP. ELECTRO 22	20%	16V	
C102	CE04EW1C190K	CAP. ELECTRO 19	20%	16V	
C103	CE04EW1C220K	CAP. ELECTRO 22	20%	16V	
C104	CE04EW1C220K	CAP. ELECTRO 22	20%	16V	
C105	CE04EW1C100M	CAP. ELECTRO 10	20%	16V	
C106	CH1-1357-05	CAP. METALIZED 0.1	10%	100V	
C107	CH1-1357-05	CAP. METALIZED 0.1	10%	100V	
C108	CH1-1357-05	CAP. METALIZED 0.1	10%	100V	
C109	CH1-1357-05	CAP. METALIZED 0.1	10%	100V	
C110	CH1-1357-05	CAP. METALIZED 0.1	10%	100V	
D1	RT2102JC	DIODE, ZENER 9.95V			
D2	RT2102JC	DIODE, ZENER 9.95V			
D3	RT25.1J8	DIODE, ZENER 5.07V			
D101	1SS133	DIODE			
D102	1SS133	DIODE			
J101	KP2-1061-05	JUMPING RES. ZERO OHM (6mA)			
JW101	S36-0408-05	WIRE ASS'Y			
JW102	S36-0470-05	WIRE ASS'Y			
L1	L33-0813-05	CHOKE COIL 10UH			
L2	L33-0812-05	CHOKE COIL 10UH			
L3	L33-0812-05	CHOKE COIL 10UH			
L4	L33-0813-05	CHOKE COIL 10UH			
L5	L33-0814-05	CHOKE COIL 22UH			
L6	L33-0814-05	CHOKE COIL 22UH			
L7	L33-0815-05	CHOKE COIL 470UH			
L8	L33-0815-05	CHOKE COIL 470UH			
P18	E40-5078-05	PIN CONNECTOR 13P			
P20	E40-5068-05	PIN CONNECTOR 21P			
P21	E40-5241-05	PIN CONNECTOR 6P			
P22	NO USE				
P23	E40-3237-05	PIN CONNECTOR 3P			
P24	E40-5078-05	PIN CONNECTOR 13P			
P25	E40-5068-05	PIN CONNECTOR 11P			
P28	E40-7830-05	PIN CONNECTOR 34P			
P101	E40-5240-05	PIN CONNECTOR 5P			
P102	E40-7036-05	PIN CONNECTOR 20P			
P103	E40-5240-05	PIN CONNECTOR 5P			
P104	E40-7231-05	PIN CONNECTOR 2P			
P105	E58-0619-05	PIN CONNECTOR 24P			
Q1	2SA1133(R)	TR. SI. PNP			
Q2	2SC1666(R)	TR. SI. NPN			
Q101	2SC2785(F)	TR. SI. NPN			
R1	RD14BB3F120J	RES. CARBON 12	5%	3W	
R2	RD14BB3F120J	RES. CARBON 12	5%	3W	
R3	RD14BB2C221J	RES. CARBON 220	5%	1/6W	
R4	RN14BE2C2002F	RES. METAL FILM 20K	1%	1/6W	
R5	RN14BE2C2002F	RES. METAL FILM 20K	1%	1/6W	
R6	RD14BB2C103J	RES. CARBON 10K	5%	1/6W	
R7	RD14BB2C221J	RES. CARBON 220	5%	1/6W	
R8	RD14BB2C182J	RES. CARBON 1K	5%	1/6W	
R9	RD14BB2C683J	RES. CARBON 6.8K	5%	1/6W	
R10	RD14BB2C683J	RES. CARBON 6.8K	5%	1/6W	
R101	RD14BB2C563J	RES. CARBON 5.6K	5%	1/6W	
R102	RD14BB2C563J	RES. CARBON 5.6K	5%	1/6W	
R103	R99-1128-05	RES. NETWORK 8X1K			
R104	RD14BB2C103J	RES. CARBON 10K	5%	1/6W	
R105	RD14BB2C104J	RES. CARBON 100K	5%	1/6W	
R106	RD14BB2C225J	RES. CARBON 2.2K	5%	1/6W	
R107	RD14BB2C222J	RES. CARBON 2.2K	5%	1/6W	
R108	RD14BB2C101J	RES. CARBON 100	5%	1/6W	
S101	S62-0608-05	DIP SWITCH			

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION
U1	SJ24556L	IC,DUAL HIGH CURRENT OP AMP
T101	MAX232EPE	IC,RS-232C DRIVERS/RECEIVERS
T102	SN75160BN	IC,OCTAL GP-IB TRANSCEIVER
T103	SN75161BN	IC,OCTAL GP-IB TRANSCEIVER
T104	TC74HC244AP	IC,OCTAL BUS TRANSCEIVER
T105	UPD7210C	IC,GP-IB CONTROLLER
VR1	R12-1551-05	RES, SEMI FIXED 1KB

FINAL UNIT

X80-1140-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	FD1-0891-03	HEAT SINK
	FD2-0902-04	HEAT SINK
	J30-0805-05	SPACER
	J73-0023-13	PCB (UNMOUNTED)
	L92-1110-05	FERRITE BEADS
	MB5-0622-04	SCREW,SEMS PAN HD M3X8
	MB9-3008-41	SCREW,BINDING TAPTITE 3X8
	R92-1061-05	JUMPING RES. ZERO OHM (5MM)
C1	CB1-1357-05	CAP. MYLAR 0.1 10% 100V
C2	CB1-1275-05	CAP. ELECTRO 33000 5.5V
C3	CB1-1275-05	CAP. ELECTRO 33000 5.5V
C4	CK45FB1H472K	CAP. CERAMIC 4700P 10% 50V
C5	CE04HW1E220	CAP. ELECTRO 22 20% 25V
C6	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C8	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C10	CC45FCH1H270J	CAP. CERAMIC 27P 5% 50V
C11	CB1-1337-05	CAP. MYLAR 0.1 10% 100V
C12	NO USE	
C13	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C14	CC45SL1H221J	CAP. CERAMIC 220P 5% 50V
C15	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C8A	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C103	CC45FCH1H050C	CAP. CERAMIC 5P 0.25P 50V
C104	CB1-1351-05	CAP. MYLAR 0.01 10% 100V
C105	CK45FB2H472K	CAP. CERAMIC 4700P 10% 500V
C108	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C109	CC45FCH2B010C	CAP. CERAMIC 1P 0.25P 500V
C110	CC45FCH2E050C	CAP. CERAMIC 5P 0.25P 500V
C111	CB1-1358-05	CAP. METALIZED 0.01 10% 250V
C112	CB1-1358-05	CAP. METALIZED 0.01 10% 250V
C113	CB1-1360-05	CAP. METALIZED 0.1 10% 250V
C114	CB1-1360-05	CAP. METALIZED 0.1 10% 250V
C115	CC45FCH1E040C	CAP. CERAMIC 4P 0.25P 50V
C116	CE04HW1E220M	CAP. ELECTRO 22 20% 25V
C120	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C121	CC45FCH1H070D	CAP. CERAMIC 7P 0.5P 50V
C122	CB1-1357-05	CAP. MYLAR 0.1 10% 100V
C301	CE04HW1C331M	CAP. ELECTRO 330 20% 16V
C302	CE04HW1C331M	CAP. ELECTRO 330 20% 16V
C303	NO USE	
C304	CE04EW2A220M	CAP. ELECTRO 22 20% 100V
C305	CE04A2E4R7J	CAP. ELECTRO 4.7 20% 250V
C306	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C307	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C308	NO USE	
C309	CB1-1357-05	CAP. MYLAR 0.1 10% 100V
C310	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C311	NO USE	
C312	CK45FB2H472K	CAP. CERAMIC 4700P 10% 500V
C313	NO USE	
C314	CK45FB2H472K	CAP. CERAMIC 4700P 10% 500V
C315	CK45FB2H472K	CAP. CERAMIC 4700P 10% 500V
C801	CC45FSL1H391J	CAP. CERAMIC 390P 5% 50V
C802	CE04EW0J331M	CAP. ELECTRO 330 20% 6.3V
C803	CE04EW0J331M	CAP. ELECTRO 330 20% 6.3V
C806	CK45FB1H102K	CAP. CERAMIC 1000P 10% 50V
C807	CB1-1357-05	CAP. MYLAR 0.1 10% 100V
C808	CE04EW1C100M	CAP. ELECTRO 10 20% 16V
C809	CC45CH1H050C	CAP. CERAMIC 5P 0.25P 50V
C810	CE04EW0J102M	CAP. ELECTRO 1000 20% 6.3V
C811	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C812	CB1-1361-05	CAP. MYLAR 0.01 10% 100V
C813	CC45SCH1H101J	CAP. CERAMIC 100P 5% 50V
L1	L33-0806-05	CHOKE COIL (0.52UH)
L2	L33-0806-05	CHOKE COIL (0.52UH)
L3	L33-0806-05	CHOKE COIL (0.52UH)
L4	L33-0806-05	CHOKE COIL (0.52UH)
L5	L49-2201-70	FERRI INDUCTOR 22UH 10%

REF.NO	PARTS NO	NAME & DESCRIPTION
P8	E40-3238-05	PIN CONNECTOR 3P
P9	E40-7037-05	PIN CONNECTOR 25P
P8	E40-3238-05	PIN CONNECTOR 3P
P10	E40-3238-05	PIN CONNECTOR 3P
Q1	2SC3779(B)	TR, SI, NPN
Q2	2SC3779(B)	TR, SI, NPN
Q3	2SC3779(B)	TR, SI, NPN
Q4	2SC3779(B)	TR, SI, NPN
Q5	2SA1161	TR, SI, PNP
Q6	2SA1161	TR, SI, PNP
Q7	2SA1161	TR, SI, PNP
Q8	2SA1161	TR, SI, PNP
Q9	2SC3779(B)	TR, SI, NPN
Q10	2SC3779(B)	TR, SI, NPN
Q11	2SC3779(B)	TR, SI, NPN
Q12	2SC3779(B)	TR, SI, NPN
Q13	2SC1164(D)*S	TR, SI, NPN
Q14	2SC1164(D)*S	TR, SI, NPN
Q101	2SC3315(C)	TR, SI, NPN
Q102	2SC3315(C)	TR, SI, NPN
Q103	2SC3315(C)	TR, SI, NPN
Q104	2SC3315(C)	TR, SI, NPN
Q105	2SA1005(B)	TR, SI, PNP
Q106	2SA1005(B)	TR, SI, PNP
Q107	2SA1005(B)	TR, SI, PNP
Q108	2SA1005(B)	TR, SI, PNP
Q109	2SC3334(S,T)	TR, SI, NPN
Q110	2SC3334(S,T)	TR, SI, NPN
Q111	2SA1206(T)	TR, SI, PNP
Q112	2SC3334(S,T)	TR, SI, NPN
Q113	2SC3334(S,T)	TR, SI, NPN
Q114	2SC3600(E,F)	TR, SI, NPN
Q115	2SC3600(E,F)	TR, SI, NPN
Q116	2SA1006(E,F)	TR, SI, PNP
Q117	2SA1006(E,F)	TR, SI, PNP
Q118	2SA1206(S)	TR, SI, PNP
R1	RN14B2B2G000F	RES, METAL FILM 100 1% 1/6W
R2	RN14B2B2C100F	RES, METAL FILM 100 1% 1/6W
R3	RD14BB2G470J	RES, CARBON 47 5% 1/6W
R4	RD14BB2G470J	RES, CARBON 47 5% 1/6W
R5	RD14BB2G010J	RES, CARBON 100 5% 1/6W
R6	RD14BB2G432J	RES, CARBON 4.3K 5% 1/6W
R7	RD14BB2G432J	RES, CARBON 4.3K 5% 1/6W
R8	RD14BB2C010J	RES, CARBON 100 5% 1/6W
R9	RD14BB2G470J	RES, CARBON 47 5% 1/6W
R10	RD14BB2C470J	RES, CARBON 47 5% 1/6W
R11	RD14BB2C152J	RES, CARBON 1.5K 5% 1/6W
R12	RD14BB2C152J	RES, CARBON 1.5K 5% 1/6W
R13	RD14BB2C302J	RES, CARBON 30K 5% 1/6W
R14	RD14BB2C153J	RES, CARBON 15K 5% 1/6W
R15	RN14B2B2C2700F	RES, METAL FILM 270 1% 1/6W
R16	RN14B2B2C2700F	RES, METAL FILM 270 1% 1/6W
R17	RN14B2B2C2700F	RES, METAL FILM 270 1% 1/6W
R20	RN14B2C1200F	RES, METAL FILM 120 1% 1/6W
R21	RN14B2C1200F	RES, METAL FILM 120 1% 1/6W
R22	RD14BB2C680J	RES, CARBON 680 5% 1/6W
R23	RD14BB2C680J	RES, CARBON 680 5% 1/6W
R24	RD14BB2C821J	RES, CARBON 820 5% 1/6W
R25	RN14B2E1801F	RES, METAL FILM 1.8K 1% 1/6W
R26	RN14B2E1801F	RES, METAL FILM 1.8K 1% 1/6W
R27	RD14BB2C471J	RES, CARBON 470 5% 1/6W
R28	RD14BB2C471J	RES, CARBON 470 5% 1/6W
R29	RD14BB2C471J	RES, CARBON 470 5% 1/6W
R30	RD14BB2C471J	RES, CARBON 470 5% 1/6W
R31	RD14BB2C470J	RES, CARBON 47 5% 1/6W
R32	RD14BB2C470J	RES, CARBON 47 5% 1/6W
R33	RD14BB2C470J	RES, CARBON 47 5% 1/6W
R34	RD14BB2C470J	RES, CARBON 47 5% 1/6W
R35	RN14B2E2K68F	RES, METAL FILM 68.0 1% 1/4W
R36	RN14B2E2K68F	RES, METAL FILM 68.0 1% 1/4W
R37	RN14B2C1300F	RES, METAL FILM 130 1% 1/6W
R38	NO USE	
R39	RD14BB2C203J	RES, CARBON 20K 5% 1/6W
R40	NO USE	
R41	RD14BB2C470J	RES, CARBON 47 5% 1/6W
R42	RD14BB2C121J	RES, CARBON 120 5% 1/6W
R43	RD14BB2C222J	RES, CARBON 2.2K 5% 1/6W
R44	RD14BB2C222J	RES, CARBON 2.2K 5% 1/6W
R45	RD14BB2E152J	RES, CARBON 15 5% 1/4W
R46	RD14BB2E152J	RES, CARBON 15 5% 1/4W
R47	RD14BB2C224J	RES, CARBON 22 5% 1/6W
R48	RD14BB2C224J	RES, CARBON 22 5% 1/6W
R49	NO USE	
R50	R92-1430-05	RES, METAL FILM 510 5% 7W
R51	RD14BB2E220J	RES, CARBON 22 5% 1/6W
R52	R92-1420-05	RES, METAL FILM 510 5% 7W
R53	RD14BB2C224J	RES, CARBON 22 5% 1/6W
R54	NO USE	
R56	RD14BB2C361J	RES, CARBON 360 5% 1/6W
R56	RD14BB2C361J	RES, CARBON 360 5% 1/6W

PARTS LIST

REF.NO	PARTS NO	NAME & DESCRIPTION			
R59	RD14BB2C183J	RES. CARBON	18K	5%	1/6W
R80	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R81	RN14BB2G226J	RES. CARBON	22	5%	1/6W
R82	RN14BB2C1901F	RES. METAL FILM	1K	1%	1/6W
R83	R92-1480-05	RES. LT3300	1.6K	5%	1/6W
R84	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R85	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R101	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R102	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R103	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R104	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R105	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R106	RD14BB2C332J	RES. CARBON	3.3K	5%	1/6W
R107	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R108	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R112	RD14BB2C151J	RES. CARBON	150	5%	1/6W
R113	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R114	RD14BB2C431J	RES. CARBON	430	5%	1/6W
R117	RN14BX2C8800F	RES. METAL FILM	880	1%	1/6W
R118	RN14BX2C6800F	RES. METAL FILM	680	1%	1/6W
R119	RN14BX2C5101F	RES. METAL FILM	5.1K	1%	1/6W
R120	RN14BX2C3901F	RES. METAL FILM	3.9K	1%	1/6W
R121	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R122	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R123	RN14BX2C2001F	RES. METAL FILM	2K	1%	1/6W
R124	RN14BX2C1501F	RES. METAL FILM	1.5K	1%	1/6W
R125	RN14BX2C1501F	RES. METAL FILM	1.5K	1%	1/6W
R126	RD14BB2C309J	RES. CARBON	3.9M	5%	1/6W
R127	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R128	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R129	RD14BB2C309J	RES. CARBON	3.9M	5%	1/6W
R130	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R131	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R132	RN14BX2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R133	RN14BX2C1301F	RES. METAL FILM	1.3K	1%	1/6W
R134	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R135	NO USE				
R136	RD14BB2C394J	RES. CARBON	390K	5%	1/6W
R137	RN14BX2C182J	RES. CARBON	1.8K	5%	1/6W
R138	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R139	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R140	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R141	RD14BB2C152J	RES. CARBON	1.5K	5%	1/6W
R142	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R143	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R144	RN14BX2E2002F	RES. METAL FILM	20K	1%	1/4W
R145	RN14BX2E3601F	RES. METAL FILM	3.6K	1%	1/4W
R146	R92-1434-05	RES. SPECIAL POWER	47K	5%	1/2W
R147	RN14BX2C7500F	RES. METAL FILM	750	1%	1/6W
R148	RN14BX2C3601F	RES. METAL FILM	3.6K	1%	1/6W
R149	RN14BX2C4702F	RES. METAL FILM	47K	1%	1/6W
R150	RN14BX2C4702F	RES. METAL FILM	47K	1%	1/6W
R151	RN14BX2C3601F	RES. METAL FILM	3.6K	1%	1/6W
R152	RN14BX2C7500F	RES. METAL FILM	750	1%	1/6W
R153	RN14BX2B2002F	RES. METAL FILM	20K	1%	1/4W
R154	RN14BX2E2002F	RES. METAL FILM	20K	1%	1/4W
R155	R92-1434-05	RES. SPECIAL POWER	47K	5%	1/2W
R156	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R157	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R158	RD14BB2C191J	RES. CARBON	190	5%	1/6W
R159	RD14BB2C470J	RES. CARBON	47	5%	1/6W
R164	RD14BB2C203J	RES. CARBON	20K	5%	1/6W
R180	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R181	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R182	RD14BB2C222J	RES. CARBON	2.2K	5%	1/6W
R183	RD14BB2C821J	RES. CARBON	820	5%	1/6W
R201	RD14BB2C275J	RES. CARBON	2.7M	5%	1/6W
R202	RD14BB2C133J	RES. CARBON	13K	5%	1/6W
R203	NO USE				
R204	RD14BB2C472J	RES. CARBON	4.7K	5%	1/6W
R601	RD14BB2C133J	RES. CARBON	13K	5%	1/6W
R602	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R603	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R604	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R605	RD14BB2C153J	RES. CARBON	15K	5%	1/6W
R606	RD14BB2C273J	RES. CARBON	27K	5%	1/6W
R607	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R610	RD14BB2C224J	RES. CARBON	220K	5%	1/6W
R611	RD14BB2C823J	RES. CARBON	82K	5%	1/6W
R612	R92-1481-05	RES. LT3000	130	5%	1/6W
R613	R92-1162-05	RES. LT3000	560	5%	1/6W
R614	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R615	RD14BB2C302J	RES. CARBON	3K	5%	1/6W
R616	RD14BB2C123J	RES. CARBON	12K	5%	1/6W
R617	RN14BX2C1101F	RES. METAL FILM	1.1K	1%	1/6W
R618	RD14BB2C185J	RES. CARBON	1.8M	5%	1/6W
R619	NO USE				

REF.NO	PARTS NO	NAME & DESCRIPTION			
VR20	R92-1180-05	RES. LT3000	510	5%	1/6W
VR21	R92-1180-05	RES. LT3000	510	5%	1/6W
TC1	C05-0471-05	CAP. TRIMMER	30P		
TC2	C05-0470-05	CAP. TRIMMER	20P		
TC09	C05-0470-05	CAP. TRIMMER	20P		
TC100	NO USE				
TC101	C05-0464-05	CAP. TRIMMER	2P		
TC102	NO USE				
TC103	C05-0464-05	CAP. TRIMMER	2P		
TH2	R12-102-2	THERMISTOR			
U1	KNK01	IC.LINEAR			
U2	KNK01	IC.LINEAR			
VR1	R12-0871-05	RES. SEMI FIXED	500 B		
VR2	NO USE				
VR3	R12-3453-05	RES. SEMI FIXED	10KB		
VR4	R12-0088-05	RES. SEMI FIXED	470 B		
VR101	R12-1538-05	RES. SEMI FIXED	1KB		
VR102	R12-0571-05	RES. SEMI FIXED	500 B		
VR103	R12-3543-05	RES. SEMI FIXED	20KB		
VR201	R12-3543-05	RES. SEMI FIXED	20KB		

VR UNIT

X81-2900-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	E01-8103-05	CRT SOCKET			
	P03-0659-14	HEAT SINK			
	J10-0041-05	TUBE HOLDER			
	J31-1610-04	BRACKET;FOR P.C.B.			
	J61-0521-05	SUPPORT			
	J70-0018-03	PCB (UNMOUNTED)			
	N30-0623-14	SCREW,SEMS PAN HD M3X8			
	R92-0150-05	JUMPING RES.	2E2O	OHM(10%M)	
	R92-1081-05	JUMPING RES.	2E2O	OHM (5%M)	
C1	CE04E1C471M	CAP. ELECTRO	470	20%	16V
C2	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C3	CKA682B472K	CAP. CERAMIC	4700P	10%	500V
C4	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C5	CE04E1C470M	CAP. ELECTRO	47	20%	16V
C901	C91-2537-05	CAP. CERAMIC	3300	20%	400V
C902	C91-2537-05	CAP. CERAMIC	3300	20%	400V
D1	MTZ24JC	DIODE, ZENER	23.72V		
D2	1SS132	DIODE			
D3	1SS132	DIODE			
F1	F63-0036-05	THERMAL FUSE	70°C		
JW9	E30-0473-15	WIRE ASS'Y;CRT TO FINAL			
JW10	E30-0473-15	WIRE ASS'Y;CRT TO FINAL			
JW18	E30-0471-05	WIRE ASS'Y;CRT TO HIGH V			
JW19	NO USE				
JW20	E31-0564-15	WIRE ASS'Y;AC IN TO G50			
P11	E40-3240-05	PIN CONNECTOR	5P		
P12	E40-3243-05	PIN CONNECTOR	8P		
P13	E40-3237-05	PIN CONNECTOR	2P		
P14	E40-3237-05	PIN CONNECTOR	2P		
P15	E30-0046-04	WIRE ASS'Y;FINAL			
P22A	E40-0328-05	PIN CONNECTOR	3P		
P22B	E40-0330-05	PIN CONNECTOR	3P		
Q2	2SC1384(Q)	TR. SI. XPN			
Q3	2SA684(Q)	TR. SI. PNP			
Q4	2SB1686(5)	TR. SI. XPN			
R1	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R2	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R3	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R4	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R5	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R6	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R7	RD14BB2C104J	RES. CARBON	100K	5%	1/6W
R8	RD14BB2C223J	RES. CARBON	22K	5%	1/6W
R9	NO USE				
R10	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R11	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R12	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
R13	RD14BB2C101J	RES. CARBON	100	5%	1/6W
R14	RD14BB2C333J	RES. CARBON	33K	5%	1/6W
R15	RD14BB2C433J	RES. CARBON	43K	5%	1/6W

PARTS LIST

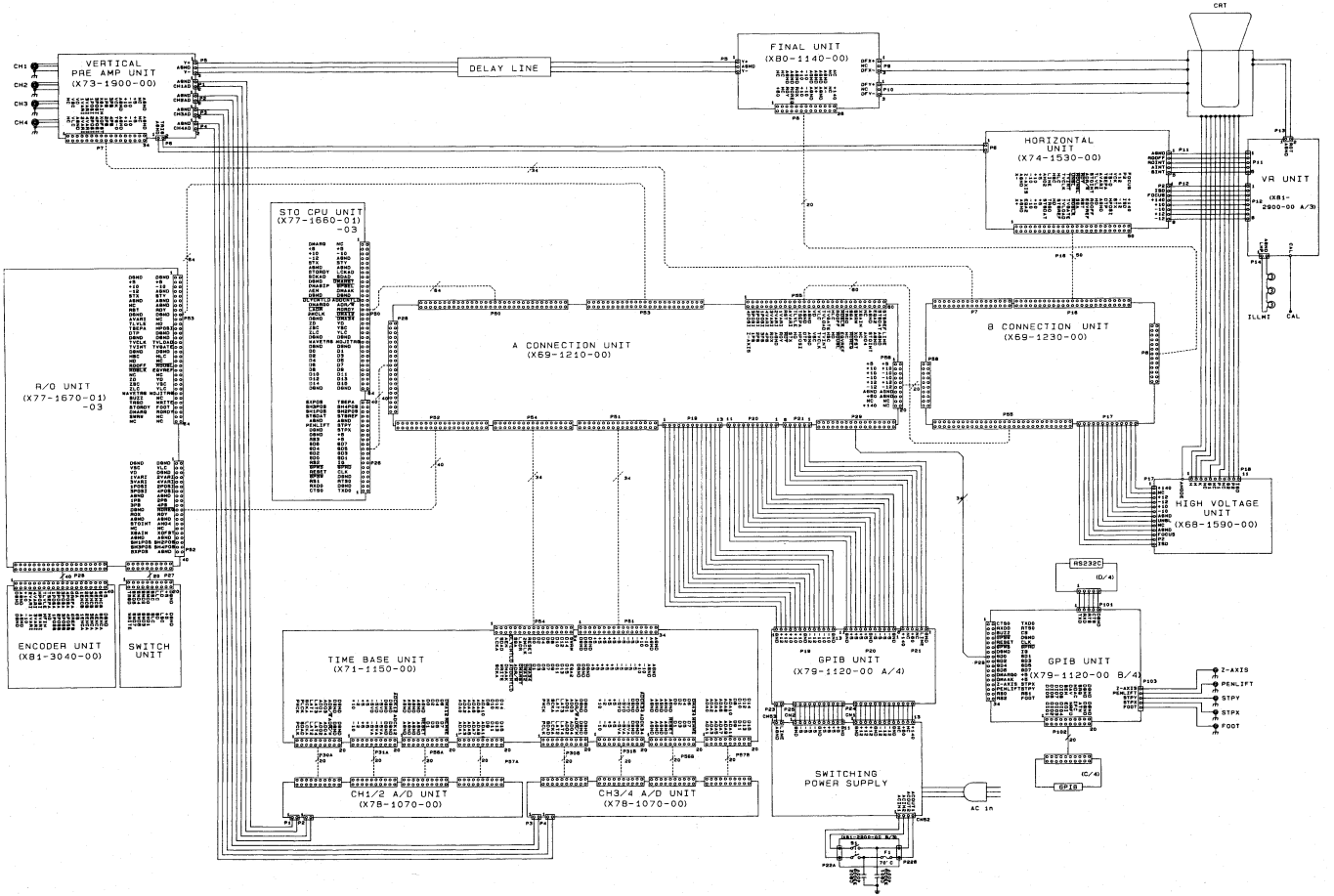
REF.NO	PARTS NO	NAME & DESCRIPTION			
R16	RD14BB2C473J	RES. CARBON	47K	5%	1/6W
R17	RD14BB2C272J	RES. CARBON	2.7K	5%	1/6W
R18	RD14BB2C100J	RES. CARBON	10	5%	1/6W
R19	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R20	RD14BB2C182J	RES. CARBON	1.8K	5%	1/6W
R21	RD14BB2C271J	RES. CARBON	270	5%	1/6W
R22	RD14BB2C102J	RES. CARBON	1K	5%	1/6W
S1	S59-2505-05	POWER SWITCH			
U1	NJM4558D	IC,DUAL OP AMP			
VR1	R10-3505-05	V.R.(A/B INT,ROT*ILLNM)20KB X2			
VR2	R10-7501-05	V.R.(FOCUS/ASTIG)500KB/500KB			
VR3	R05-3515-05	V.R. WITH SW(READOUT INT) 20KB			
VR4	R10-3505-05	V.R.(A/B INT,ROT*ILLNM)20KB X2			
VR5	R12-3543-05	RES. SEMI FIXED 20KB			
VR6	R12-1538-05	RES. SEMI FIXED 1KB			

ENCODER UNIT

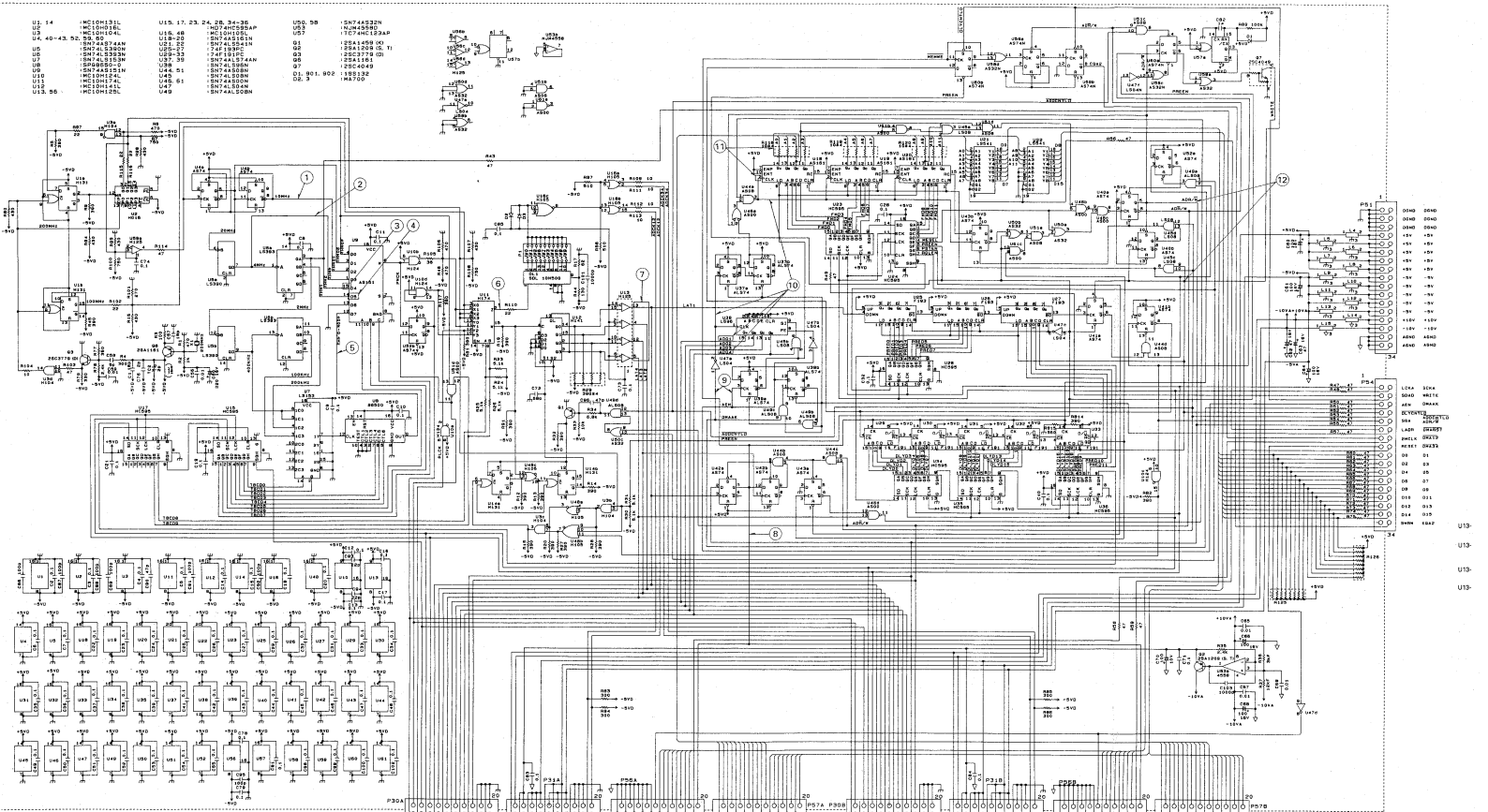
X81-3040-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	J73-0024-12	PCB (UNMOUNTED)			
C1	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C2	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C3	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C4	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C5	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C6	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C7	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C8	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C9	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C10	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C11	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C12	C91-1361-05	CAP. MYLAR	0.01	10%	100V
C13	CE04EW1J101M	CAP. ELECTRO	100	20%	10V
C14	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C15	CE04EW1C470M	CAP. ELECTRO	47	20%	16V
C16	CE04EW1C470M	CAP. ELECTRO	47	20%	16V
C17	C91-1357-05	CAP. MYLAR	0.1	10%	100V
C18	C91-1357-05	CAP. MYLAR	0.1	10%	100V
P28	E40-7236-05	PIN CONNECTOR	40P		
R1	RN14BB2C2701F	RES. METAL FILM	2.7K	1%	1/6W
R2	RN14BB2C2001F	RES. METAL FILM	2K	1%	1/6W
R3	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R4	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R5	RD14BB2C220J	RES. CARBON	22	5%	1/6W
R6	RN14BB2C2701F	RES. METAL FILM	2.7K	1%	1/6W
R7	RN14BB2C2001F	RES. METAL FILM	2K	1%	1/6W
R8	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R9	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R10	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R11	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R12	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R13	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R14	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R15	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
R16	RD14BB2C103J	RES. CARBON	10K	5%	1/6W
S1	W02-0498-05	ENCORDER SWITCH			
S2	W02-0498-05	ENCORDER SWITCH			
S3	W02-0498-05	ENCORDER SWITCH			
S4	W02-0498-05	ENCORDER SWITCH			
S5	W02-0498-05	ENCORDER SWITCH			
U1	NJM072BD	IC,JFET INPUT OP AMP			
VR6	R23-3505-05	V.R.	2X20K	B	
VR7	R05-3525-15	V.R.	20K	B	
VR8	R23-3505-05	V.R.	2X20K	B	
VR9	R10-3504-15	ENDLESS VOLUME	2X10K	B	
VR10	R10-3504-15	ENDLESS VOLUME	2X10K	B	
VR11	R10-3504-15	ENDLESS VOLUME	2X10K	B	
VR12	R10-3504-15	ENDLESS VOLUME	2X10K	B	
VR13	R10-3504-15	ENDLESS VOLUME	2X10K	B	
VR14	R10-3504-15	ENDLESS VOLUME	2X10K	B	

SCHEMATIC DIAGRAM

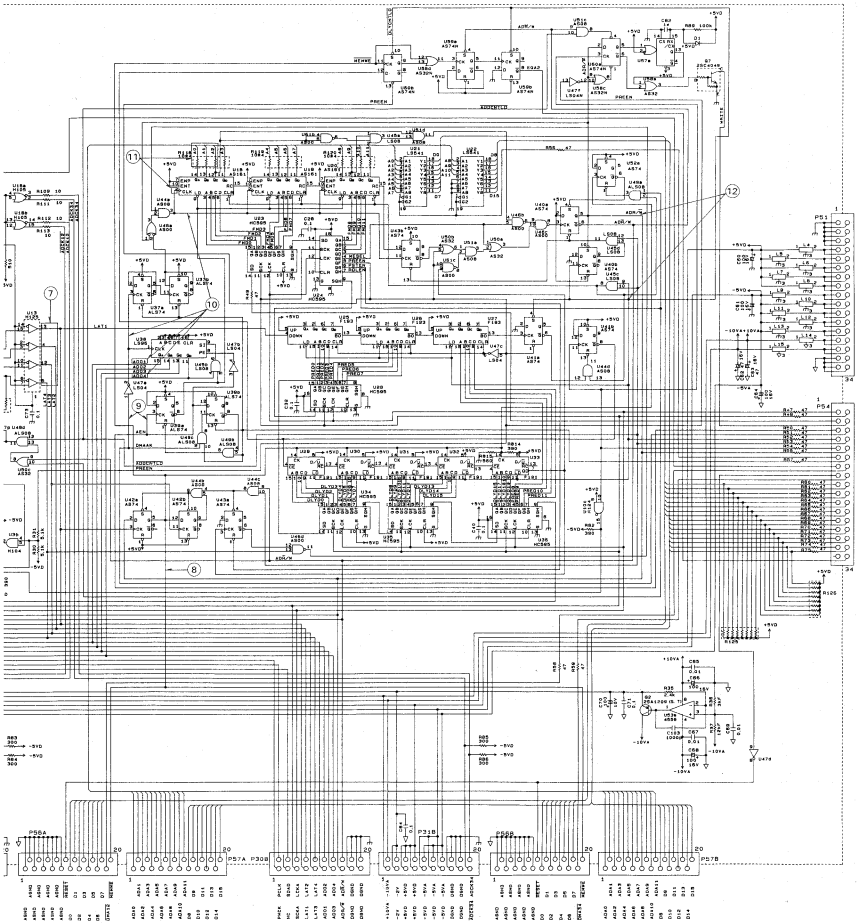


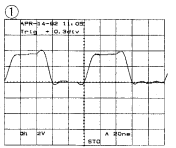
TIME BASE UNIT (X71-1150-00)

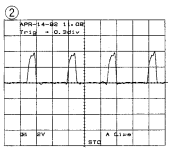


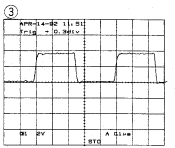
SCHEMATIC DIAGRAM

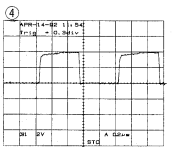
TBC UNIT

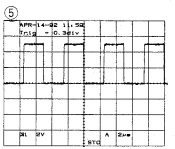


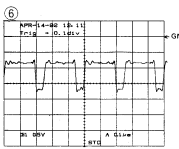


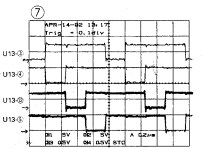


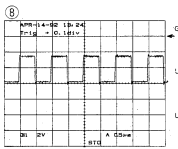


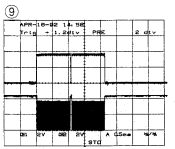


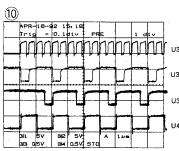


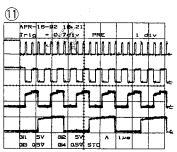


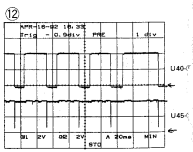




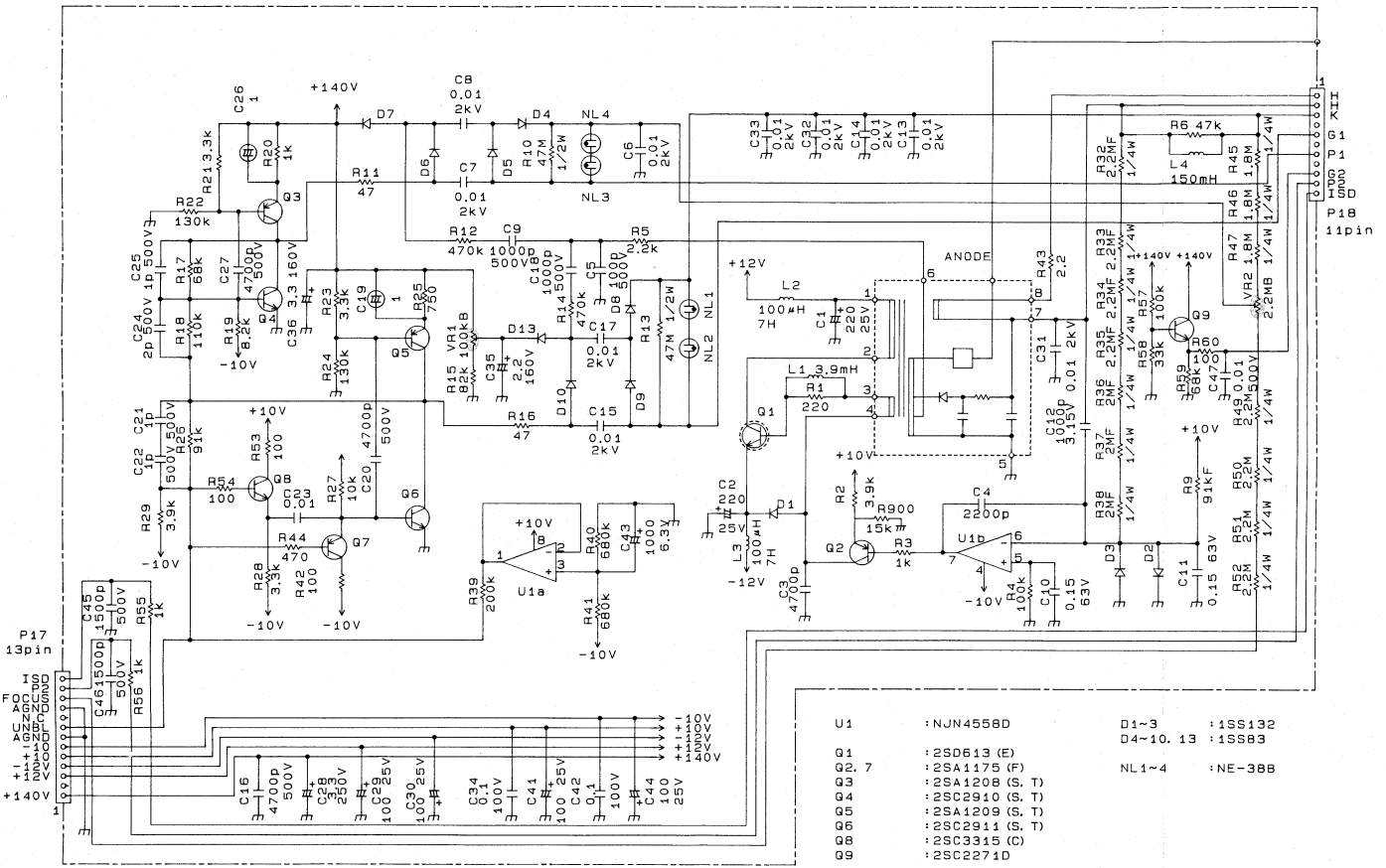




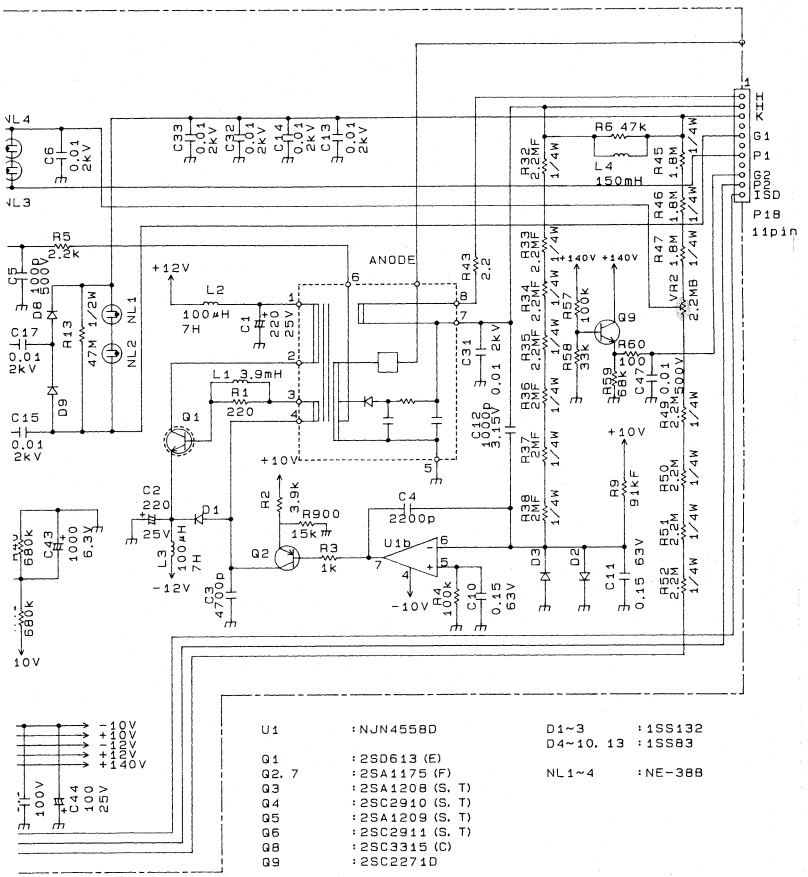




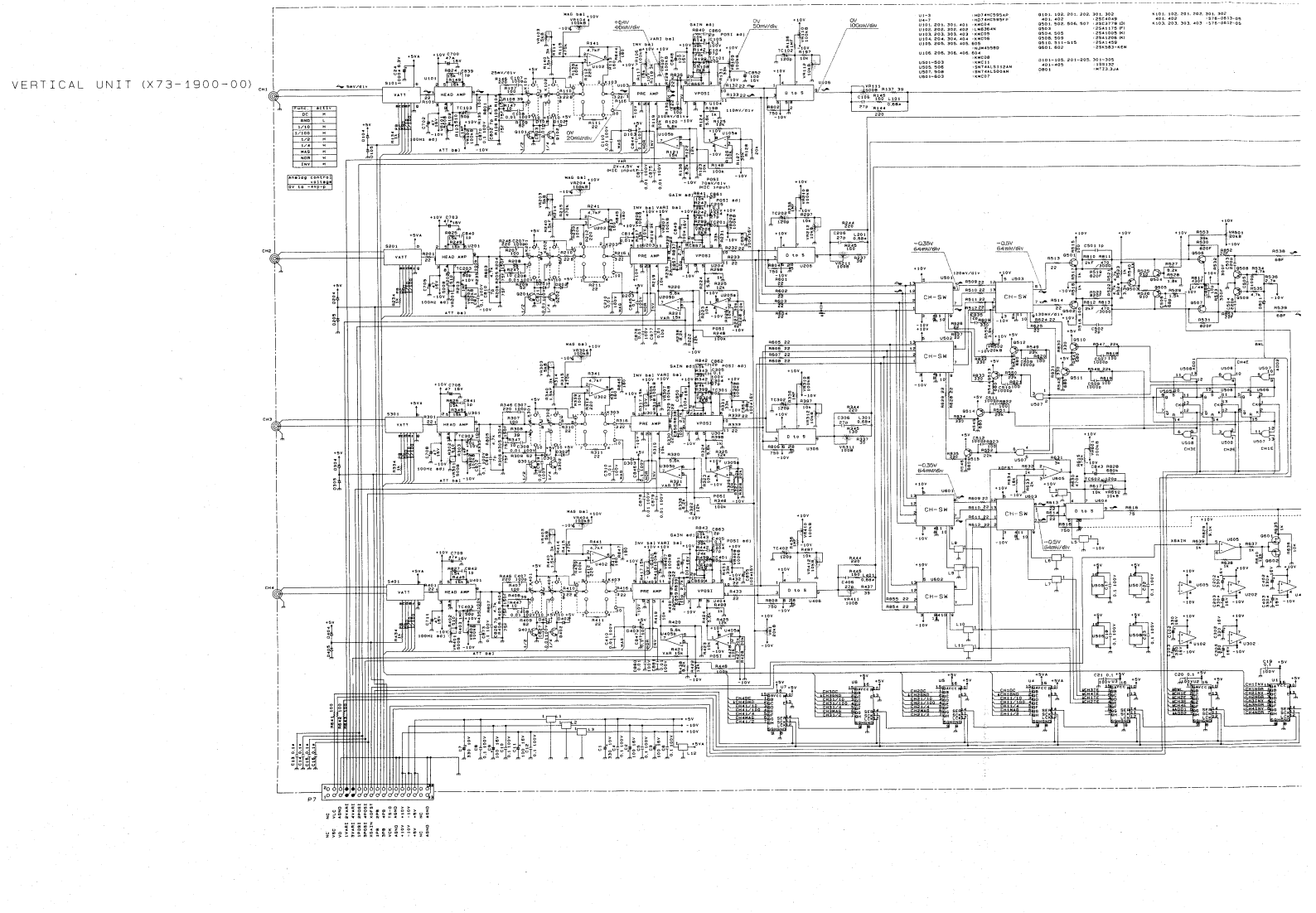
HIGH VOLTAGE UNIT (X68-1590-00)



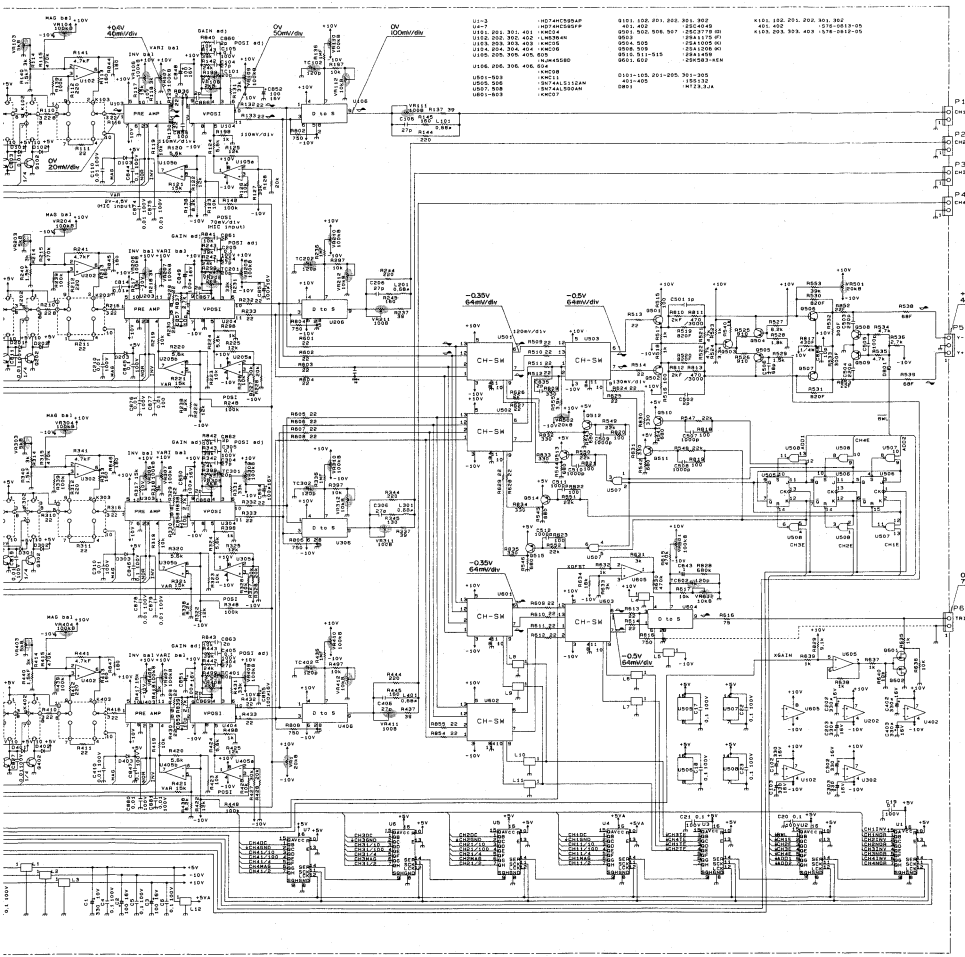
U1	:NJN4558D	D1~3	:1SS132
		D4~10. 13	:1SS83
Q1	:2SD613 (E)		
Q2. 7	:2SA1175 (F)	NL1~4	:NE-388
Q3	:2SA1208 (S. T)		
Q4	:2SC2910 (S. T)		
Q5	:2SA1209 (S. T)		
Q6	:2SC2911 (S. T)		
Q8	:2SC3315 (C)		
Q9	:2SC2271D		

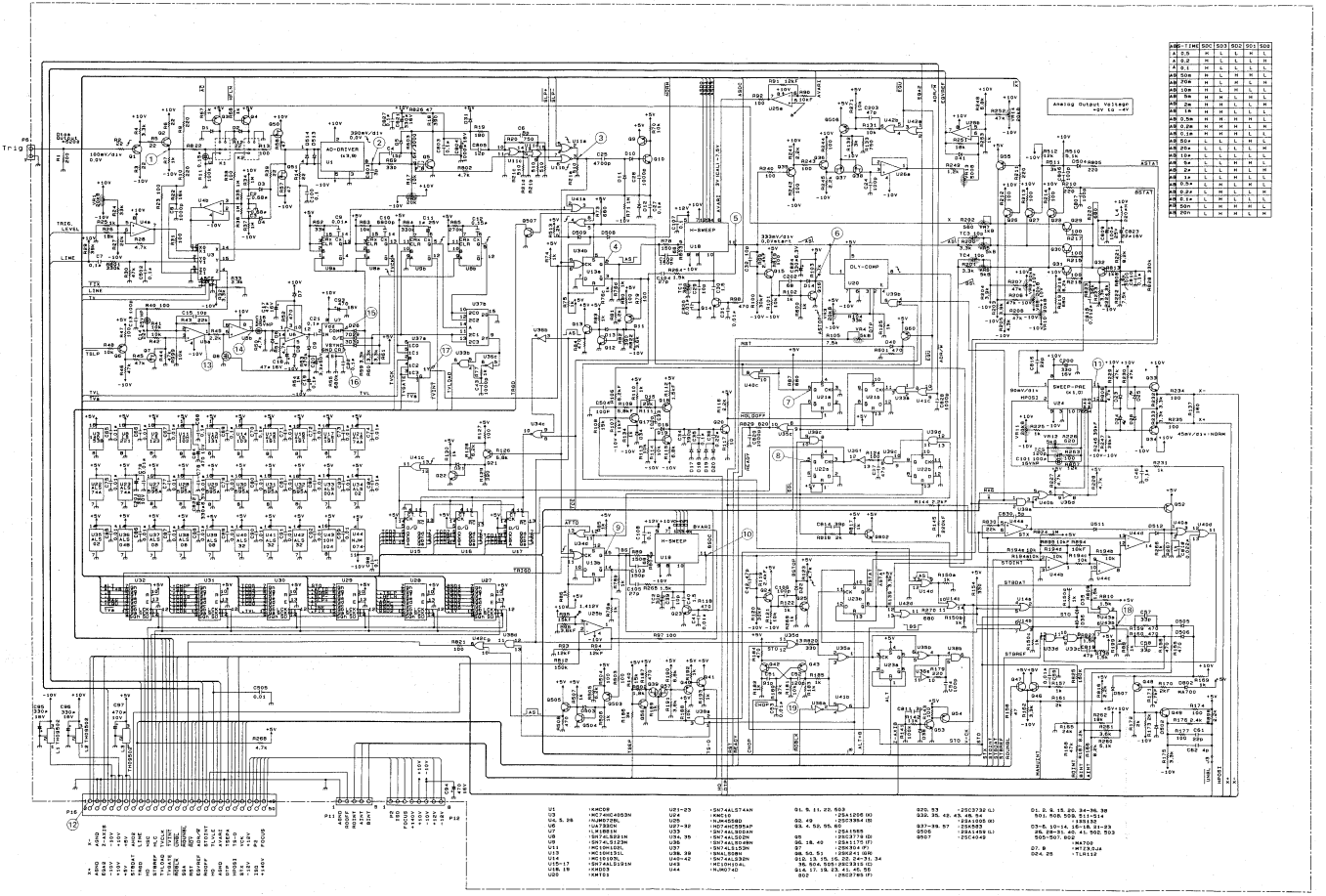

L4
C6 0.01 2kV
L3
C33 0.01 2kV
C32 0.01 2kV
C14 0.01 2kV
C13 0.01 2kV
R6 47k
L4 150mH
R32 2.2MF 1/4W
R45 1.8M 1/4W
R46 1.8M 1/4W
R47 1.8M 1/4W
VR2 2.2MB
K
G1
P1
ISD
P18
11pin
R5 2k
C5 100P 500V
D8
D9
R13 47M 1/2W
NL1
NL2
C17 0.01 2kV
C15 0.01 2kV
+12V
L2 100μH 7H
ANODE
R43 2.2
C1 220 25V
C31 0.01 2kV
L1 3.9mH
R1 220
Q1
C12 1000P 3.15KV
+140V
R33 2.2MF 1/4W
R34 2.2MF 1/4W
R35 2.2MF 1/4W
R36 2MF 1/4W
R37 2MF 1/4W
R38 2MF 1/4W
R57 100k
R58 33k
Q9
R60 68k
C47 0.01 2.2KV 500V
R59 68k
R49 2.2M 1/4W
R50 2.2M 1/4W
R51 2.2M 1/4W
R52 2.2M 1/4W
+10V
R9 91KF
C11 0.15 63V
C2 220 25V
D1
R2 3.9k
R900 15k
R3 1k
Q2
C4 2200P
U1b
D3
D2
C43 1000 6.3V
680k
680k
10V
L3 100μH 7H
-12V
C3 470P
-10V
R4 100k
C10 0.15 63V
C44 100 25V
100V
+10V
+10V
+10V
+10V
+140V
U1 :NJN4558D
Q1 :2SD613 (E)
Q2. 7 :2SA1175 (F)
Q3 :2SA1208 (S. T)
Q4 :2SC2910 (S. T)
Q5 :2SA1209 (S. T)
Q6 :2SC2911 (S. T)
Q8 :2SC3315 (C)
Q9 :2SC2271D
D1~3 :1SS132
D4~10. 13 :1SS83
NL1~4 :NE-388

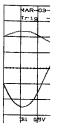
VERTICAL UNIT (X73-1900-00)

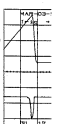


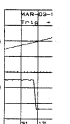
SCHEMATIC DIAGRAM

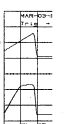


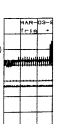




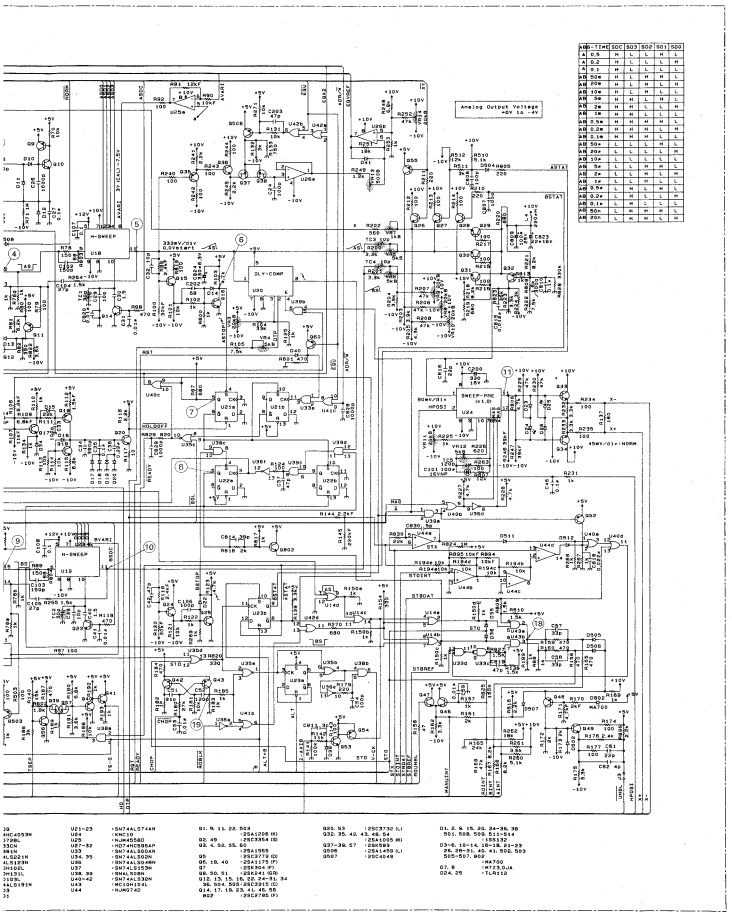


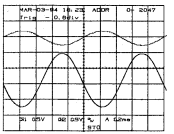


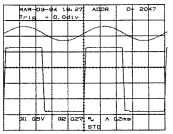


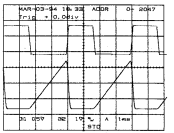


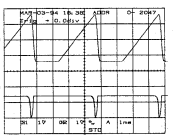
SCHEMATIC DIAGRAM

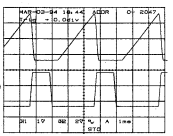


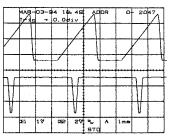


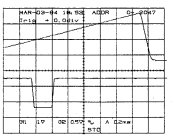


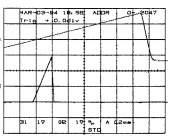


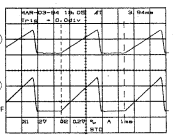


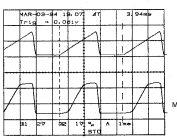




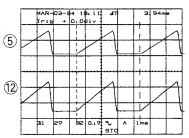


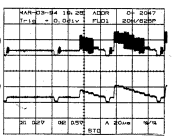


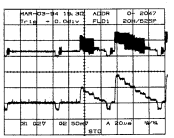


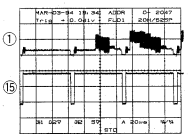


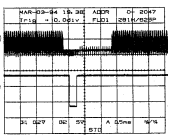
MAG:ON

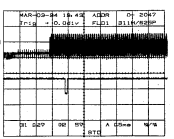


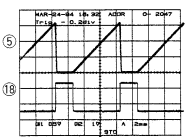


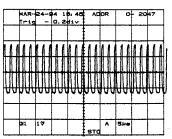




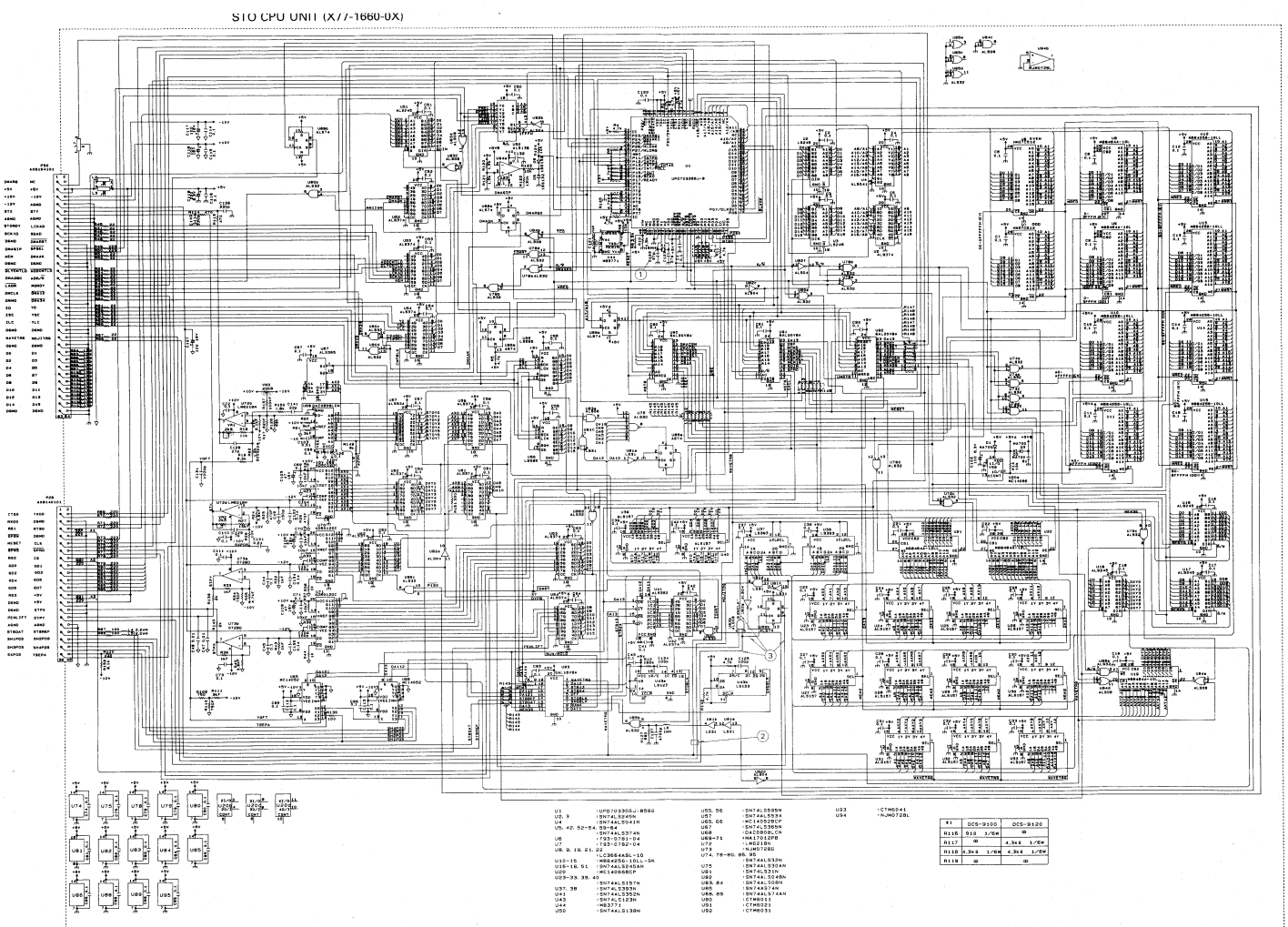








STO CPU UNIT (X77-1660-0X)



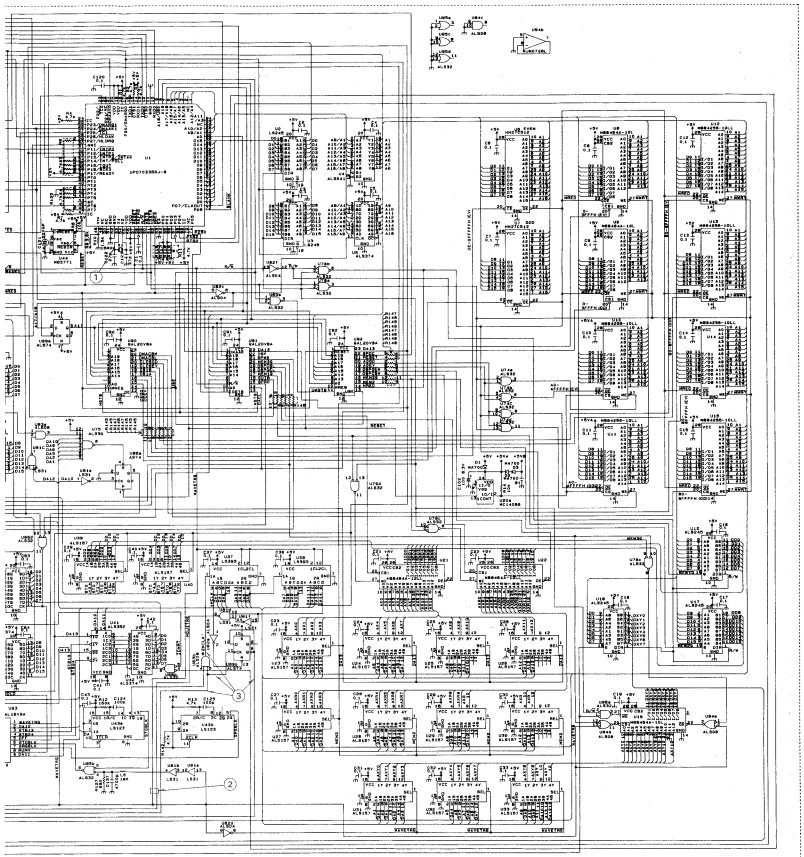
U1	:UPD70336J-8GG	U55, 56	:SN74LS688N	U33	:CTM6041		
U2, 3	:SN74LS245N	U57	:SN74HC595N	U34	:NJM072BL		
U4	:SN74AL1041N	U58, 66	:SN74LS259N				
U5, 42, 52-54, 59	:SN74AL574N	U67	:SN74LS365N				
U6	:TD3-0781-04	U68	:DAC0808LCN				
U7	:TD3-0782-04	U69-71	:HM1761DP8				
U8, 9, 19, 21, 22	:LC3664ASL-10	U72	:LM6218N				
U10-15	:MB84256-10LL-SK	U73	:NJM072BG				
U16-18, 51	:SN74ALS245AN	U74, 78-80, 85, 95	:SN74LS32N				
U20	:MC14066BCP	U75	:SN74ALS324N				
U23-33, 39, 40	:SN74AL5157N	U81	:SN74LS31N				
U37, 38	:SN74LS393N	U82	:SN74AL5048N				
U41	:SN74AL5352N	U83, 84	:SN74AL508N				
U43	:SN74LS123N	U86	:SN74AS74N				
U44	:MB3771	U88, 89	:SN74ALS74AN				
U50	:SN74AL2138N	U90	:CTM6011				
		U91	:CTM6021				
		U92	:CTM6031				

R1	DCS-9100	DCS-9120
R116	91Ω 1/6W	Ω
R117	Ω	4.3kΩ 1/6W
R118	4.3kΩ 1/6W	4.3kΩ 1/6W
R119	Ω	Ω

STO UNIT

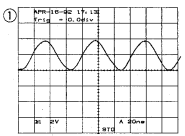
SCHEMATIC DIAGRAM

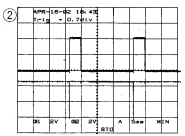
STO UNIT

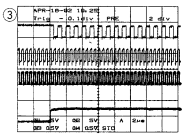


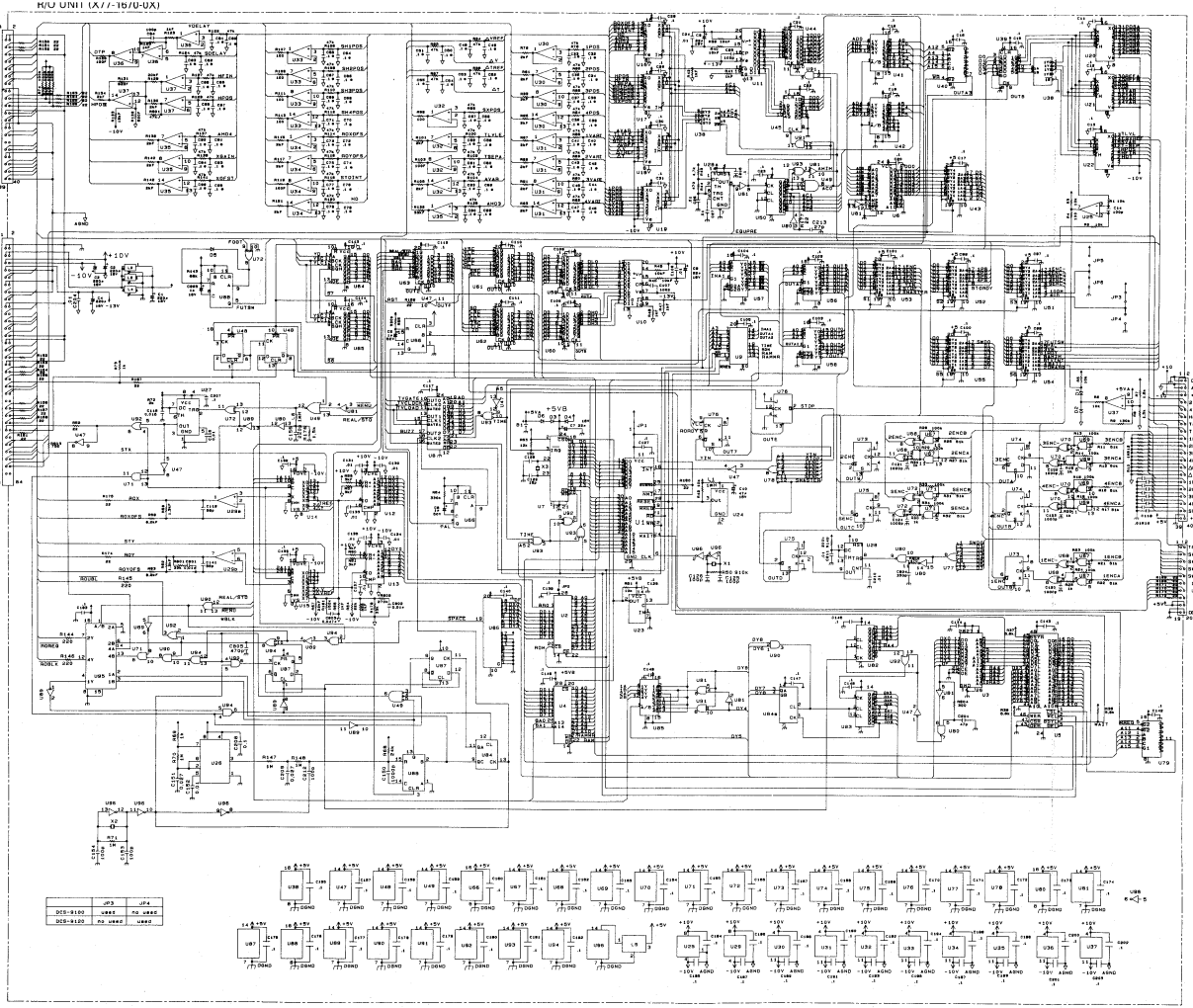
1	:UPD703350J-8586	U55, 56	:SN74LS595N	U93	:CTM6041
2, 3	:SN74LS245N	U57	:SN74ALS534	U94	:NJM0739L
4	:SN74ALS541N	U65, 66	:MC14052BCF		
5, 42, 52~54, 58~64	:SN74LS374N	U67	:SN74LS595N		
6	:SN74ALS374N	U68	:DAC0808LCN		
7	:193-0781-04	U69~71	:MA1701CPB		
8	:193-0782-04	U72	:NJM2136N		
9, 9, 19, 21, 22	:SN74LS273N	U73	:NJM2072BD		
10~15	:LC3664AB-10	U74, 78~80, 86, 95			
16~18, 51	:M5M4256-10DL-5K		:SN74AL532N		
20	:SN74ALS245AN	U75	:SN74ALS393AN		
23~33, 39, 40	:MC14066BCF	U81	:SN74LS51N		
		U82	:SN74ALS045BN		
37, 38	:SN74ALS157N	U83, 84	:SN74ALS08N		
41	:SN74ALS273N	U85	:SN74LS14N		
43	:SN74ALS595N	U86, 89	:SN74ALS74AN		
44	:SN74LS123N	U90	:CTM6031		
50	:M53771	U91	:CTM6021		
	:SN74ALS138N	U92	:CTM6031		

R1	DCS-9100	DCS-8120
R116	91Ω 1/6W	∞
R117	∞	4.7kΩ 1/6W
R118	4.7kΩ 1/8W	4.7kΩ 1/6W
R119	∞	∞





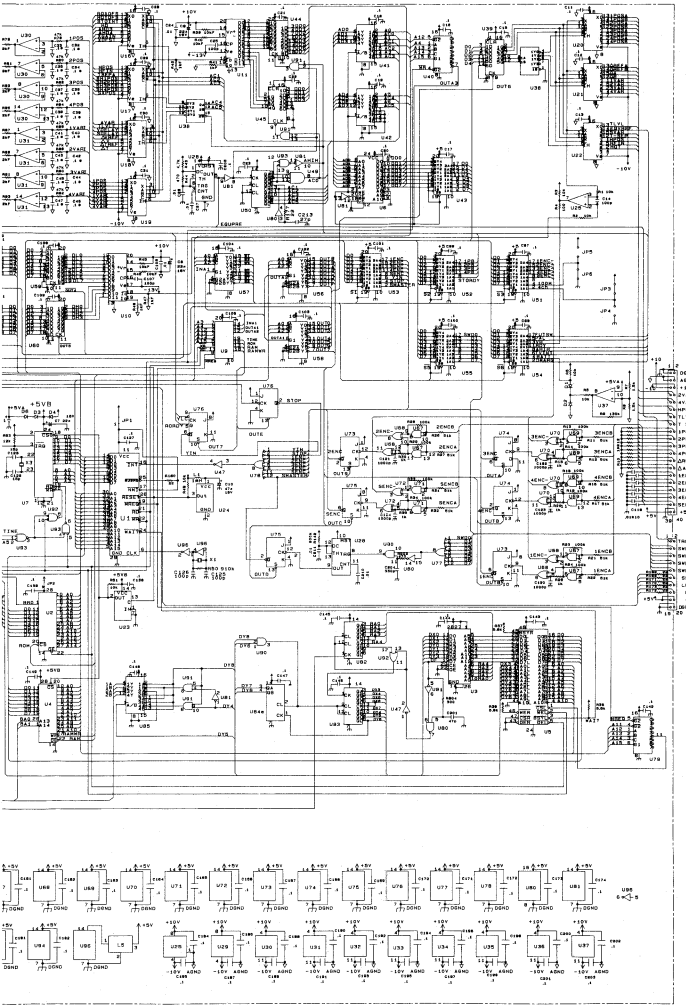




U1	: LH0080BF
U2	: T93-0703-04
U3	: T93-0704-04
U4	: MB84256-10LL
U5	: M80422-12LP
U6	: LC35785-15
U7	: HD6461QP
U8	: UPD8253C-2
U9	: DTM-5010
U10, 11	: HA17012PB
U12, 13	: DAC0808LCN
U14-22	: MC14051BCP
U23	: MC14066BCP
U24	: PST518B
U25	: LM311N
U26, 27	: HA17555PS
U28	: NJM5560
U29	: LM8218N
U30-37	: NJM074D
U38	: SN74ALS139N
U39, 45	: SN74ALS174N
U40, 56-58, 79	: SN74ALS138N
U41, 42, 85, 95	: SN74ALS157N
U43, 51-55	: SN74ALS244BN
U44, 59-63	: SN74ALS374N
U47, 81, 89	: SN74ALS04BN
U49	: SN74LS27AN
U50, 82-84	: SN74LS393N
U64, 65	: SN74LS595N
U66, 88	: SN74LS123N
U67, 69, 71	: TC74HC08AP
U68, 70, 72	: TC74HC86AP
U73-76	: SN74LS107AN
U77, 78	: SN74ALS30AN
U80	: SN74LS31N
U86	: SN74ALS688N
U87, 48	: SN74ALS74AN
U90, 91	: SN74ALS08N
U92, 93	: SN74ALS32N
U94	: SN74ALS00AN
U96	: TC74HCU04AP
D1-6	: 1SS132
B1	: W09-0408-05

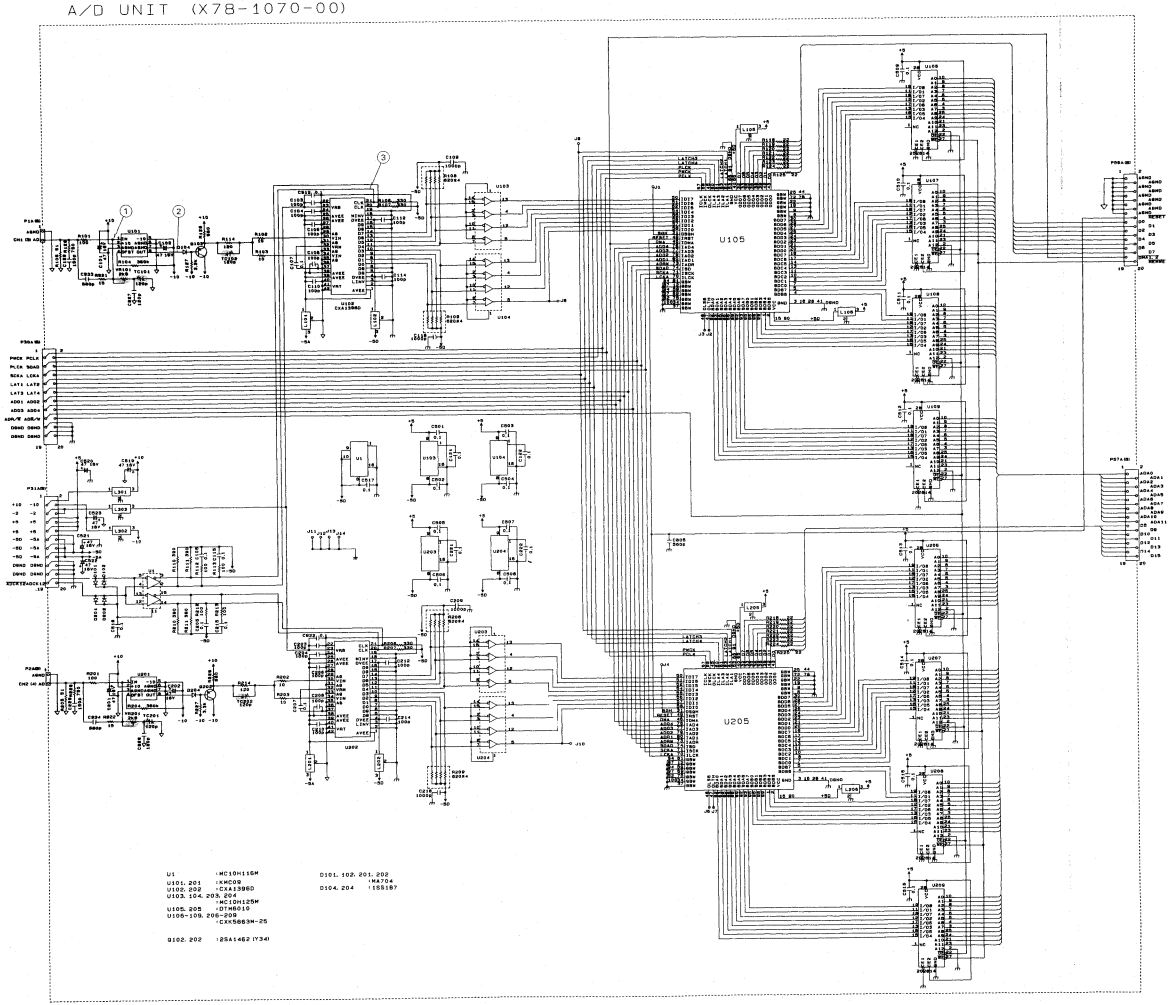
	JP3	JP4
DCS-9100	used	no used
DCS-9120	no used	used

SCHEMATIC DIAGRAM



U1	:LH0080BF
U2	:T93-0783-04
U3	:T93-0784-04
U4	:MB84256-10LL-SK
U5	:MB8422-12LP-S
U6	:LC35176S-15
U7	:HD64610P
U8	:UPD8253C-2
U9	:DTM-5010
U10, 11	:HA17012PB
U12, 13	:DAC0808LCN
U14-22	:MC14051BCP
U23	:MC14066BCP
U24	:PST518B
U25	:LM311N
U26, 27	:HA17555PS
U28	:NJM556D
U29	:LM6218N
U30-37	:NJM074D
U38	:SN74ALS139N
U39, 45	:SN74ALS174N
U40, 56-58, 79	:SN74ALS138N
U41, 42, 85, 95	:SN74ALS157N
U43, 51-55	:SN74ALS244BN
U44, 59-63	:SN74ALS374N
U47, 81, 89	:SN74ALS04BN
U49	:SN74LS27AN
U50, 82-84	:SN74LS393N
U64, 65	:SN74LS595N
U66, 88	:SN74LS123N
U67, 69, 71	:TC74HC08AP
U68, 70, 72	:TC74HC86AP
U73-76	:SN74ALS107AN
U77, 78	:SN74ALS30AN
U80	:SN74LS31N
U86	:SN74ALS86BN
U87, 48	:SN74ALS74AN
U90, 91	:SN74ALS08N
U92, 93	:SN74ALS32N
U94	:SN74ALS00AN
U96	:TC74HCU04AP
D1-6	:1SS132
B1	:W09-0408-05

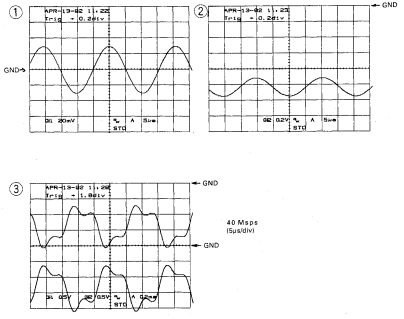
A/D UNIT (X78-1070-00)

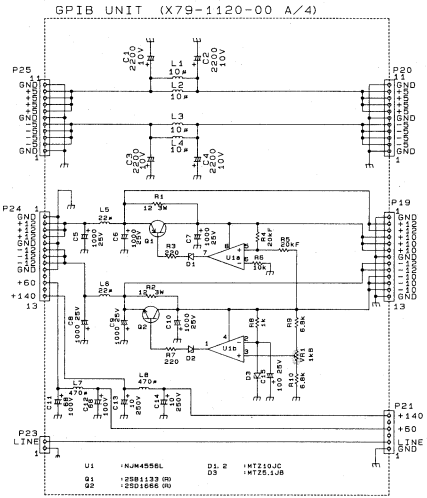


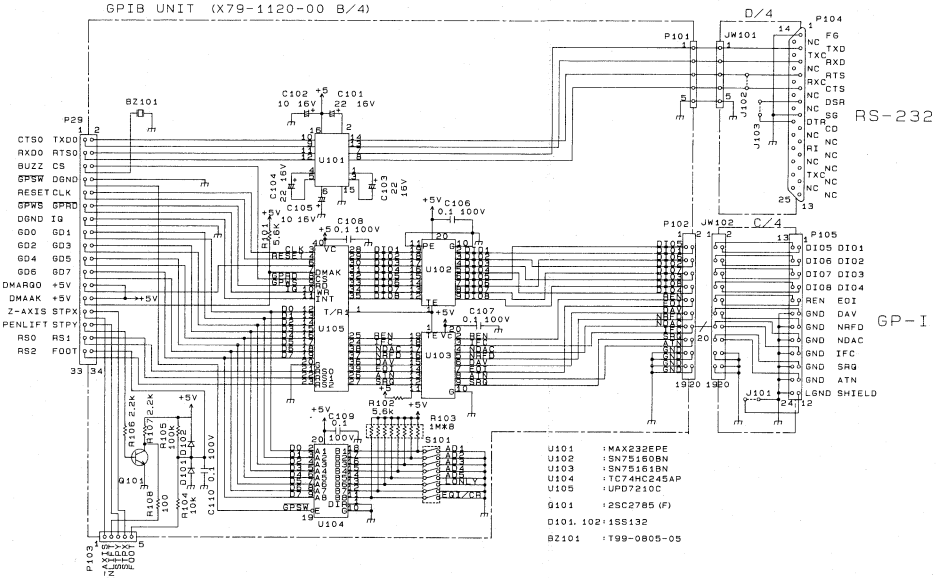
U1 :MC10H116M
U101, 201 :KMC09
U102, 202 :CXA1396D
U103, 104, 203, 204 :MC10H125M
U105, 205 :DTM6010
U106~109, 206~209 :CXK5863M-25
Q102, 202 :2SA1462 (Y34)
D101, 102, 201, 202 :MA704
D104, 204 :1SS187

SCHEMATIC DIAGRAM

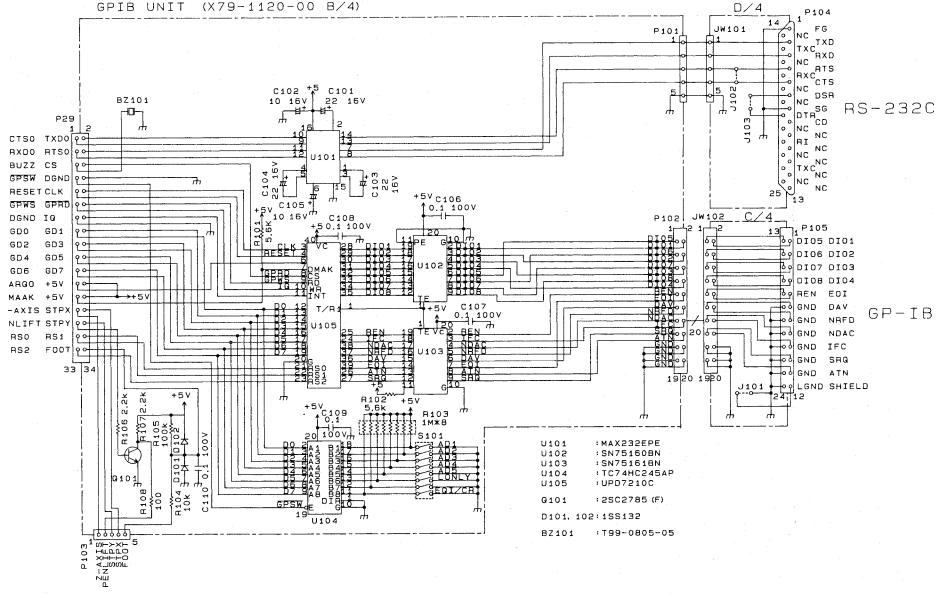
AD UNIT



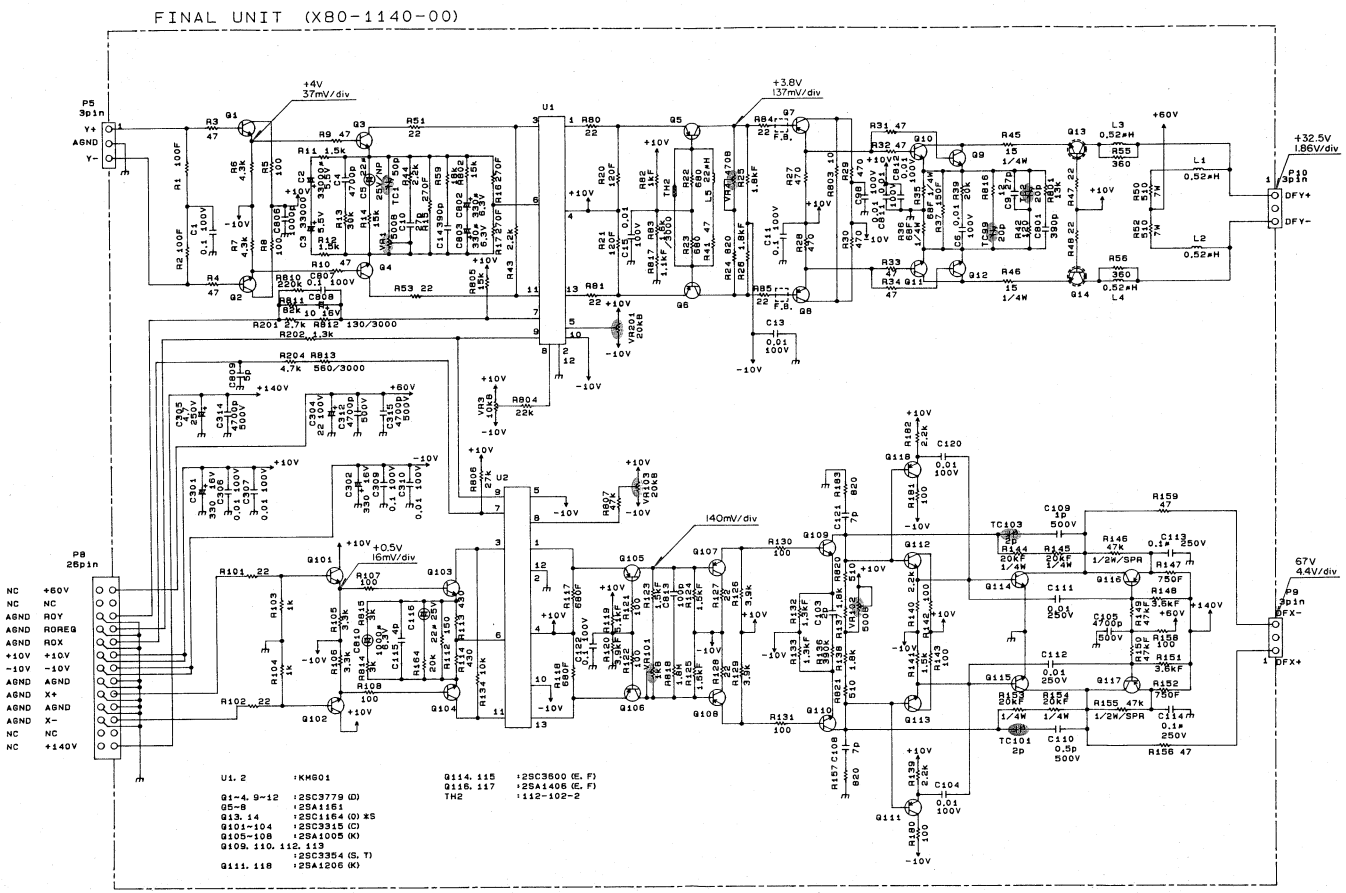

GPIB UNIT (X79-1120-00 A/4)
P25
P20
P24
P19
P23
LINE
P21
+140
+60
GND
U1 :NJM4558L
Q1 :2SB1133 (R)
Q2 :2SD1666 (R)
D1, 2 :MTZ10JC
D3 :MTZ5.1JB


GPIB UNIT (X79-1120-00 B/4)
D/4
C/4
P101
P102
P104
P105
JW101
JW102
J101
J102
J103
RS-232
GP-I
P29
P103
BZ101
U101 :MAX232EPE
U102 :SN75160BN
U103 :SN75161BN
U104 :TC74HC245AP
U105 :UPD7210C
Q101 :2SC2785 (F)
D101, 102 :1SS132
BZ101 :T99-0805-05

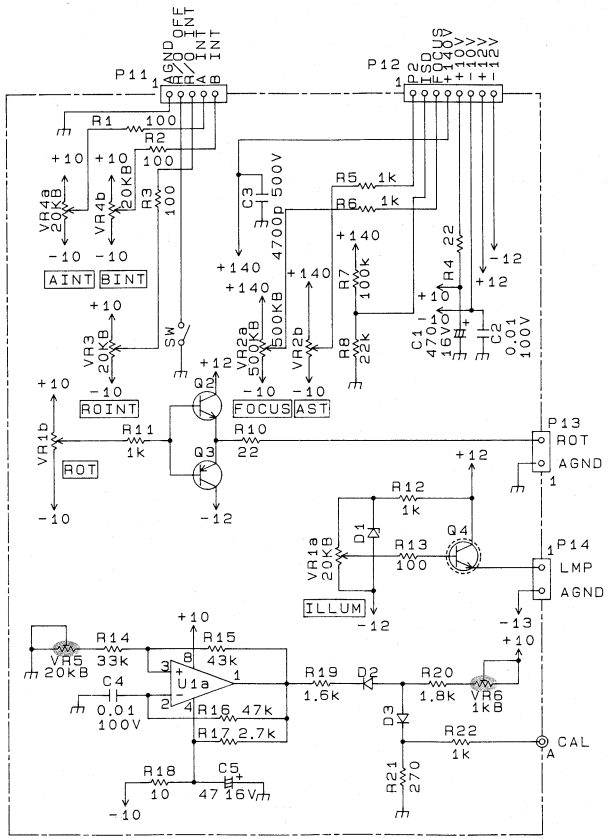
SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM



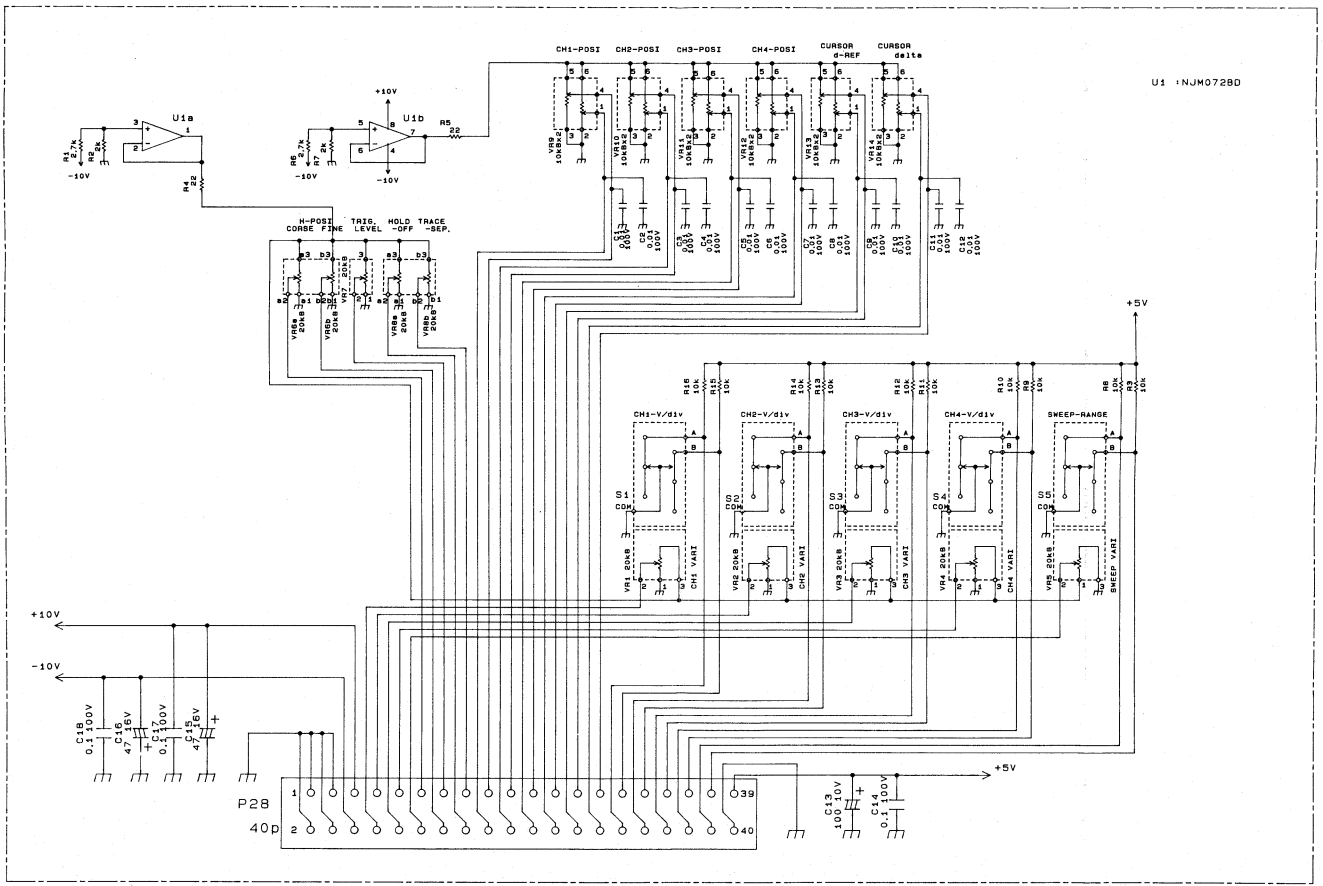
VR UNIT (X81-2900-00 A/3)



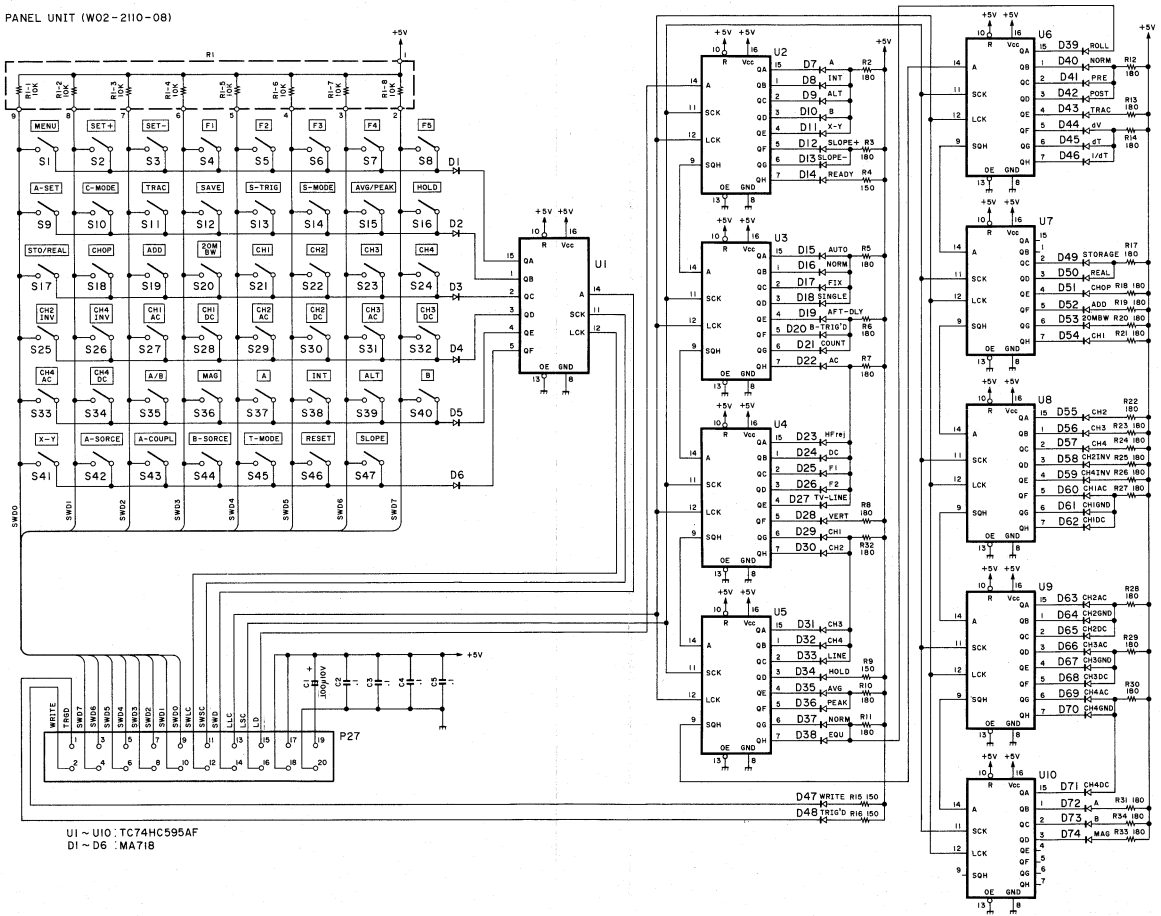
U1 : NJM4558D
D1 : MTZ24JC
D2, 3 : 1SS132
Q2 : 2SC1384 (Q)
Q3 : 2SA684 (Q)
Q4 : 2SD1666 (S)

SCHEMATIC DIAGRAM

ENCODER UNIT (X81-3040-00)

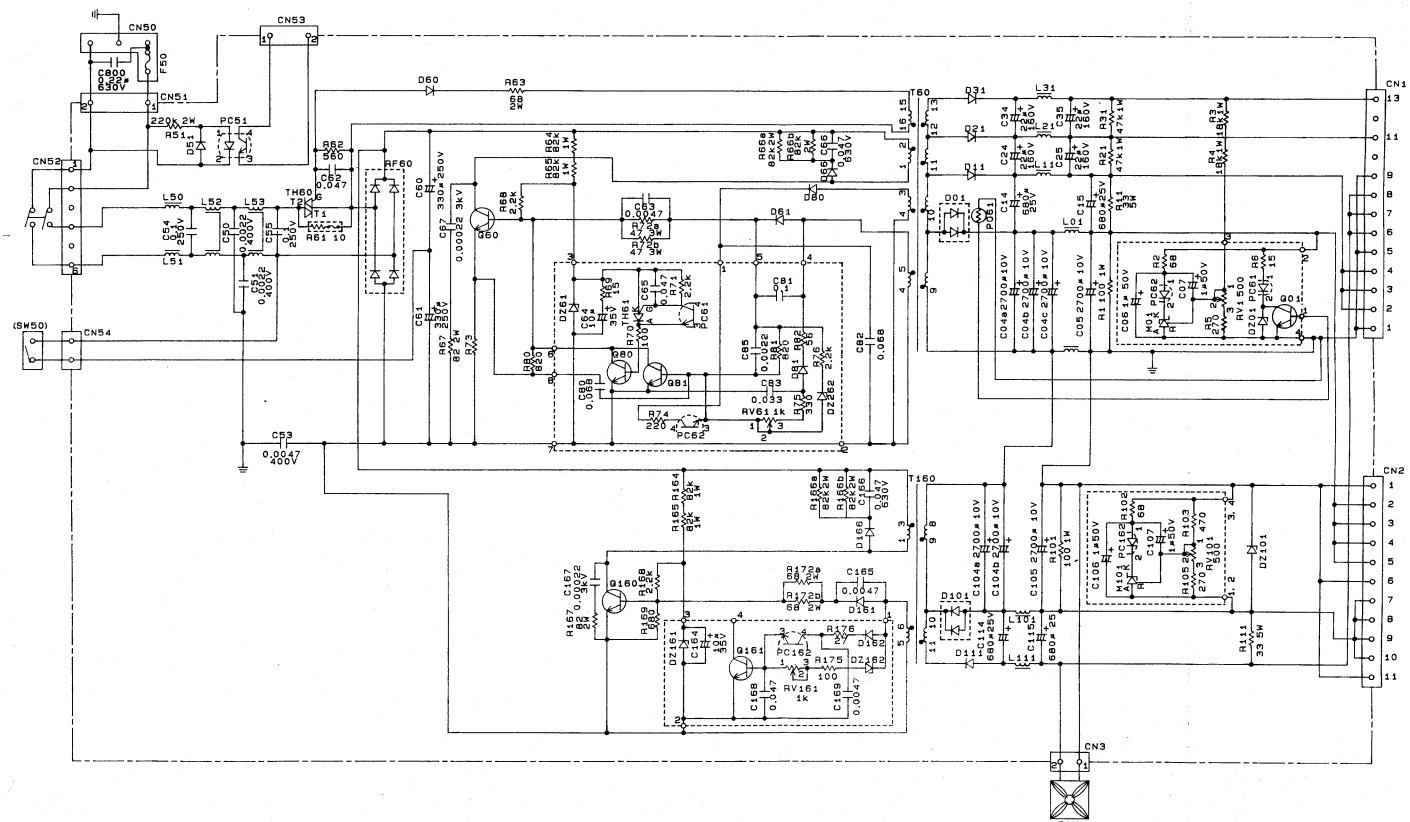


SCHEMATIC DIAGRAM



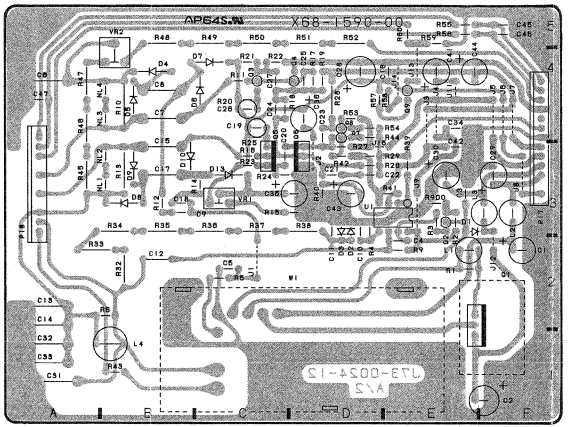
SCHEMATIC DIAGRAM

SWITCHING POWER SUPLLY UNIT (W02-2178-08)

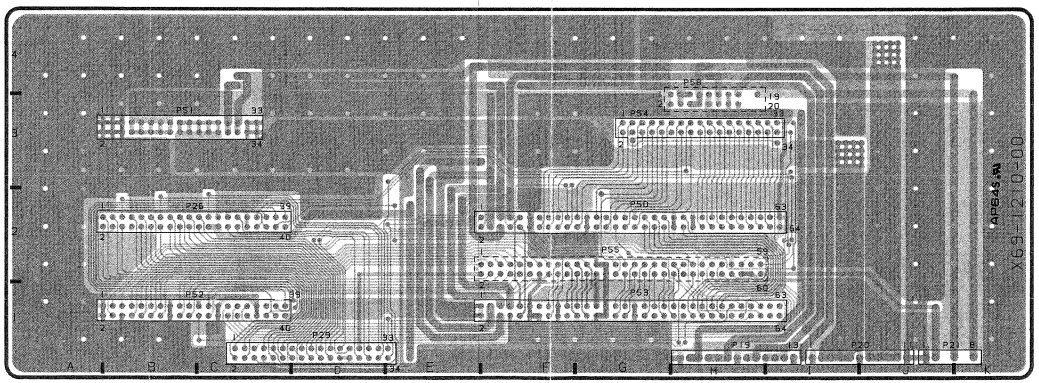


P.C. BOARD

HIGH VOLTAGE UNIT (X68-1590-00)

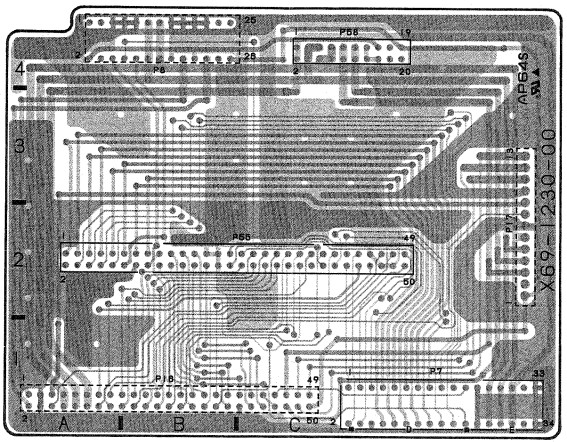


A CONNECTION UNIT (X69-1210-00)



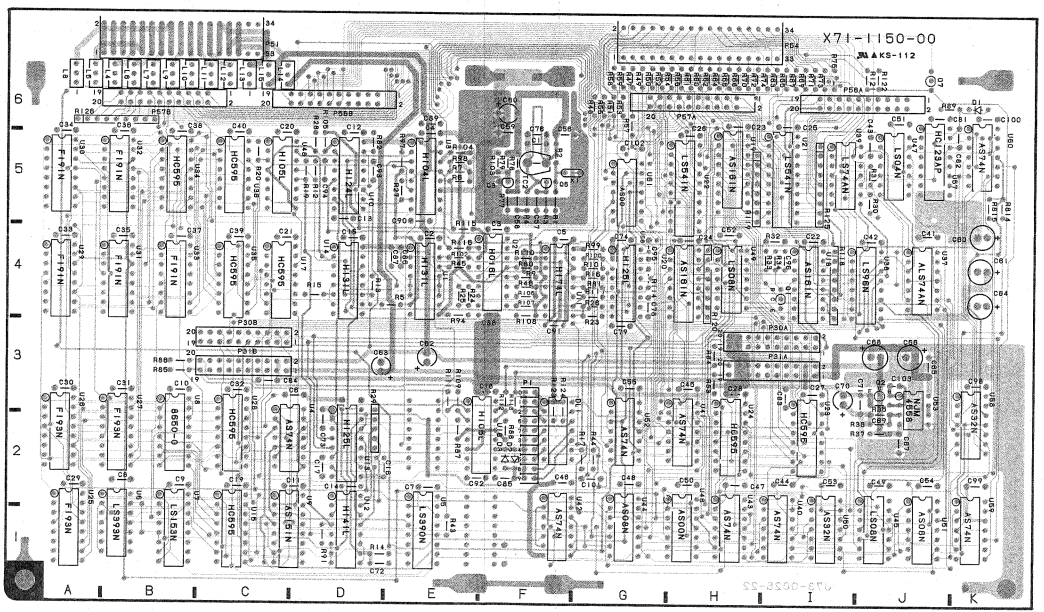
P.C. BOARD

B CONNECTION UNIT (X69-1230-00)



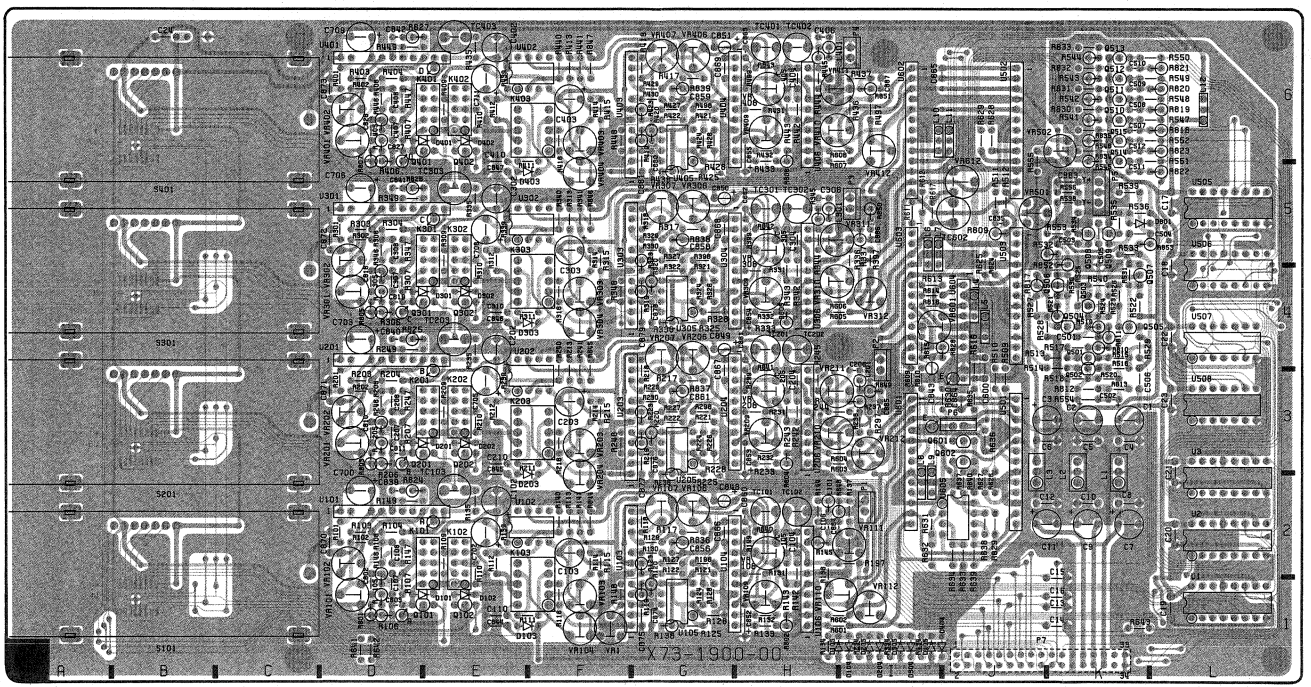
P.C. BOARD

TIME BASE UNIT (X71-1150-00)



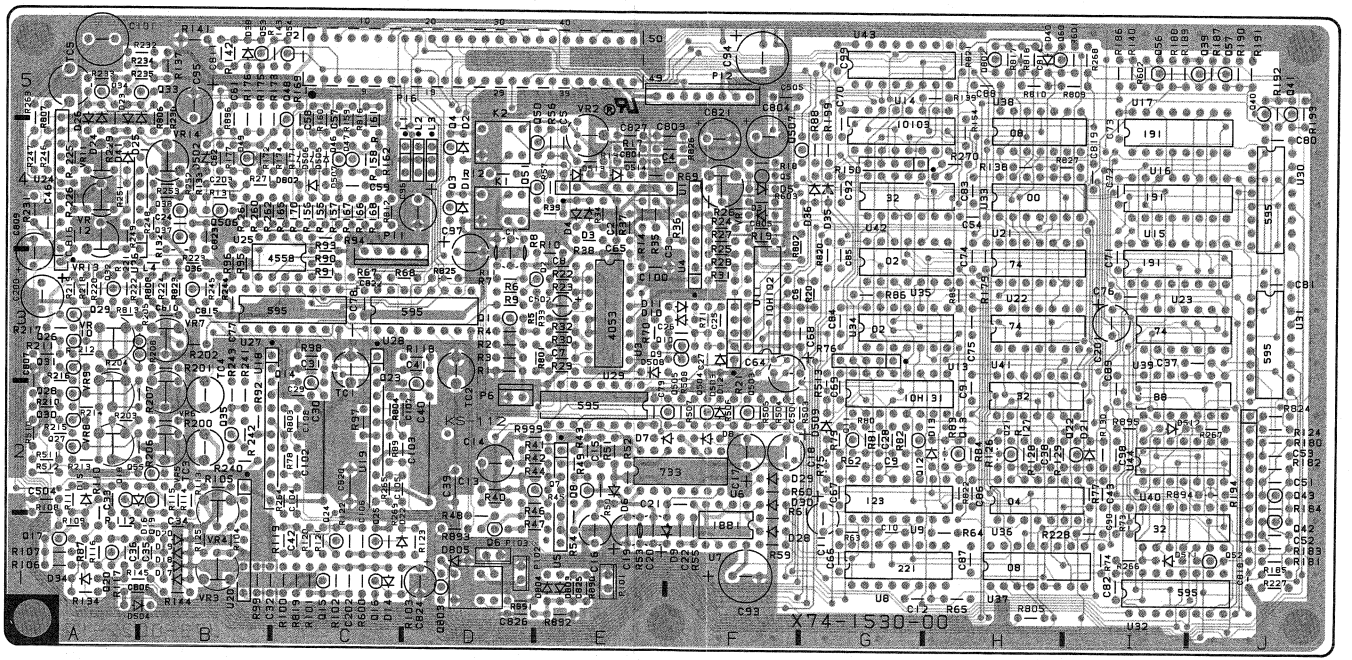
P.C. BOARD

VERTICAL UNIT (X73-1900-00)



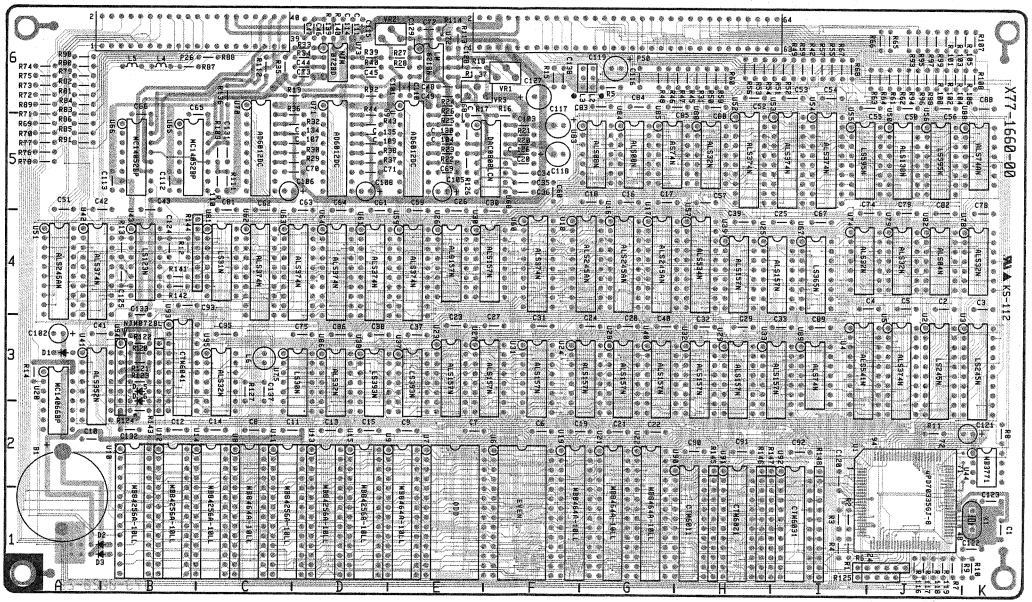
P.C. BOARD

HORIZONTAL UNIT (X74-1530-00)



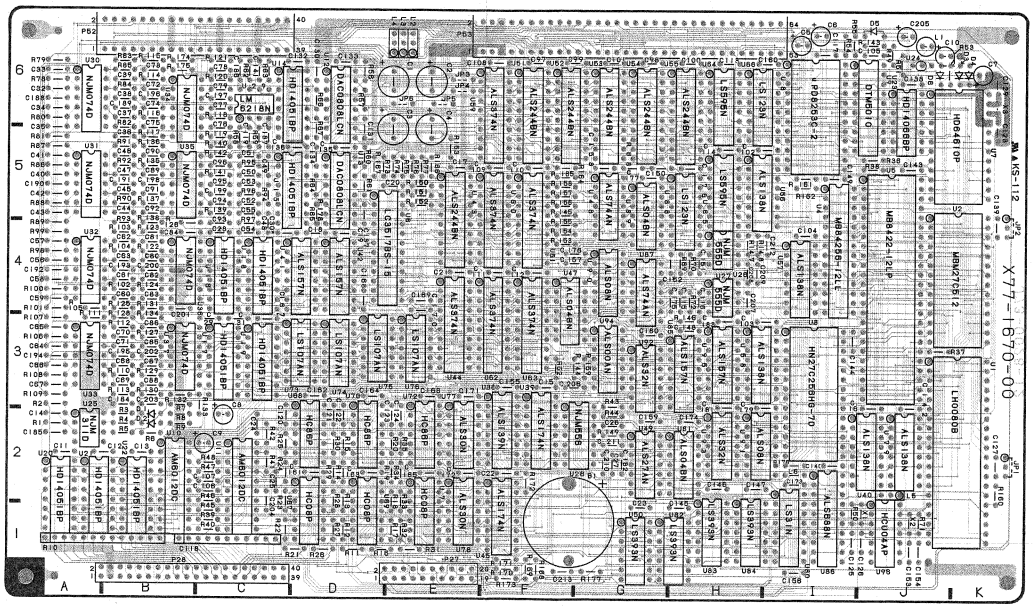
P.C. BOARD

STORAGE CPU UNIT (X77-1660-0X)



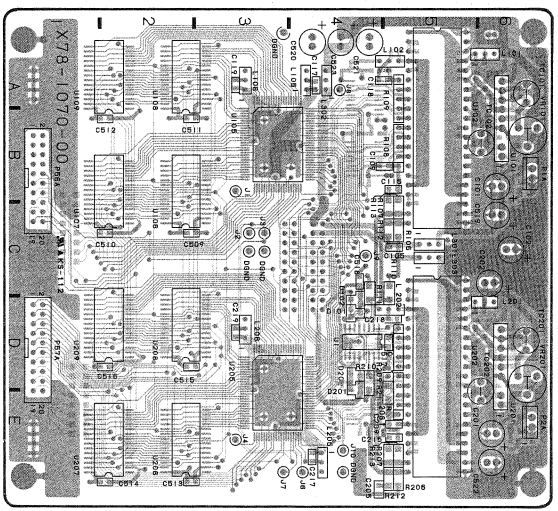
P.C. BOARD

R/O UNIT (X77-1670-0X)

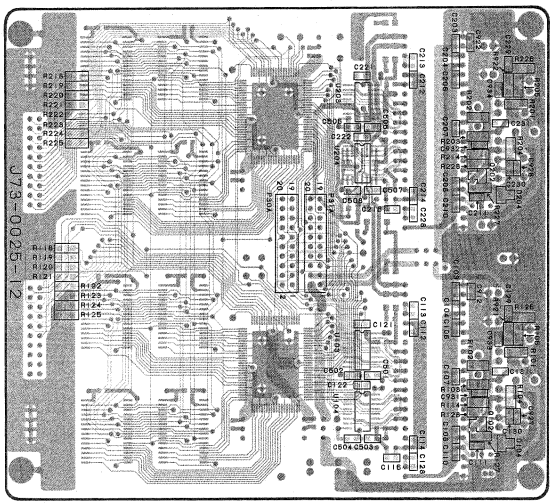


P.C. BOARD

A/D UNIT (X78-1070-00)A

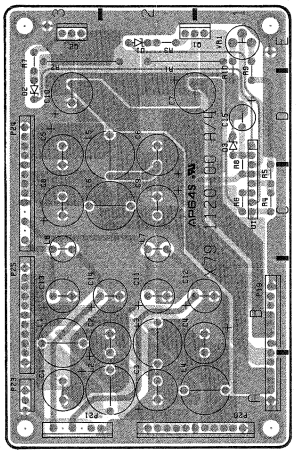


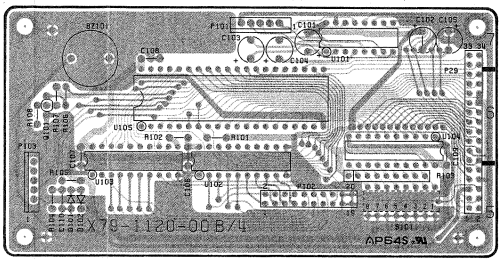
A/D UNIT (X78-1070-00)B

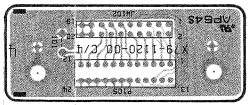


P.C. BOARD

GPIB UNIT (X79-1120-00)

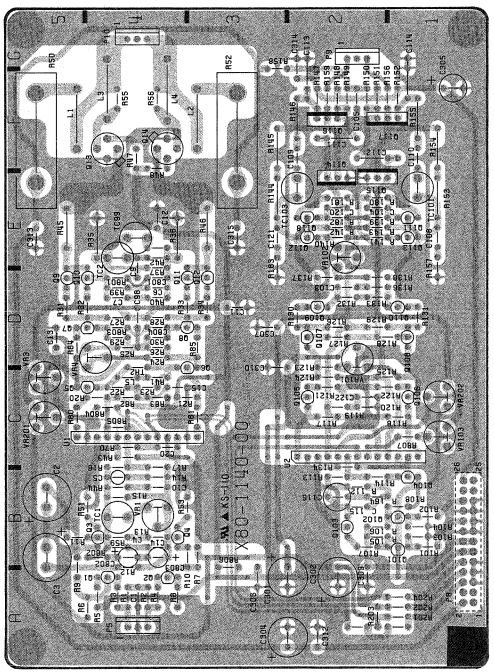




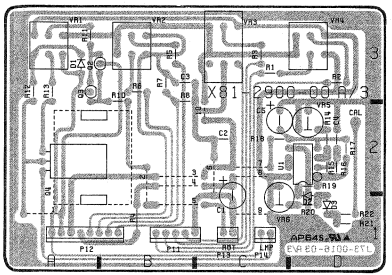


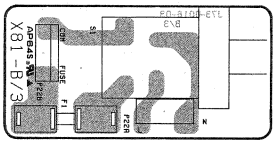
P.C. BOARD

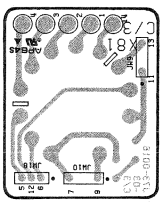
FINAL UNIT (X80-1140-00)



VR UNIT (X81-2900-00)

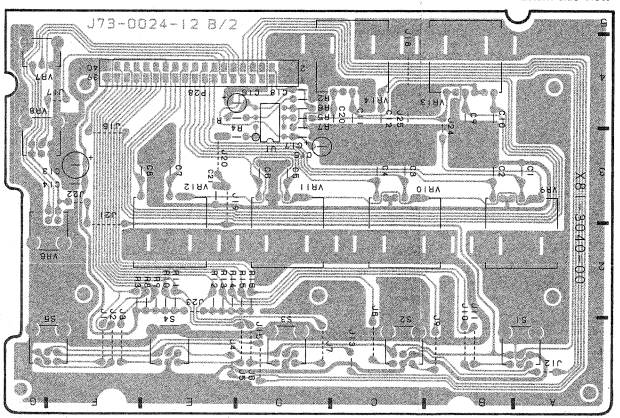


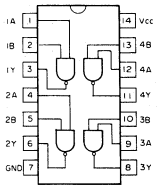




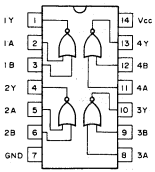
ENCODER UNIT (X81-3040-00)

Pattern side view

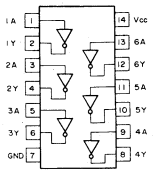




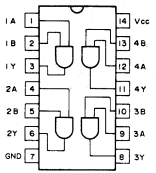
SN74ALS00AN
SN74AS00N



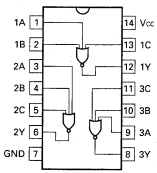
SN74ALS02N



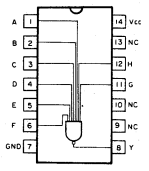
SN74LS04N
SN74AL04BN
TC74HC04AP



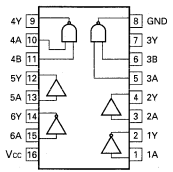
SN74AS08N
SN74LS08N
SN74ALS08N
TC74HC08AN



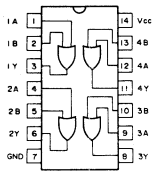
SN74ALS27N



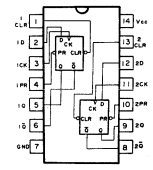
SN74ALS30AN



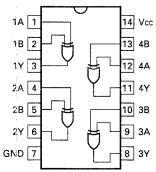
SN74LS31N



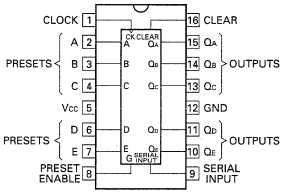
SN74AS32N
SN74ALS32AN



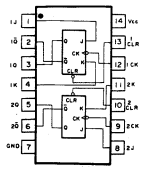
SN74ALS74AN
SN74AS74N
SN74AS74AN



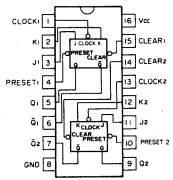
TC74HC86AP



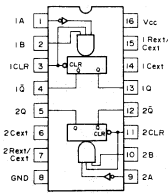
SN74LS96N



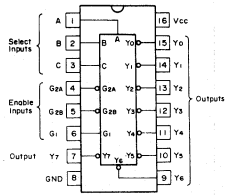
SN74LS107AN



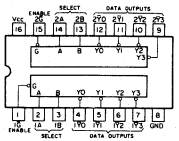
SN74ALS112AN



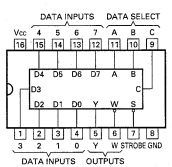
SN74LS123N
TC74HC123AP



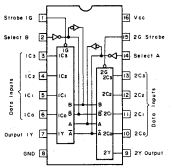
SN74ALS138N



SN74ALS139N

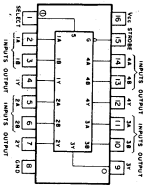


SN74AS151N

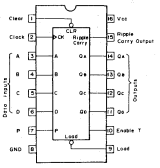


SN74LS153N

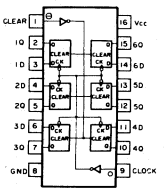
SEMICONDUCTORS



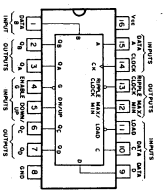
SN74ALS157AN



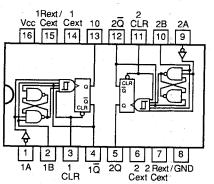
SN74AS161N



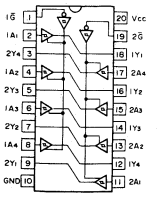
SN74ALS174N



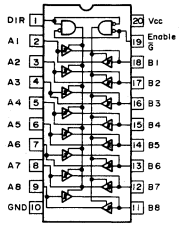
SN74ALS191N



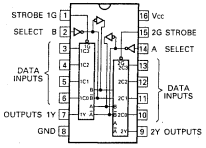
SN74LS221N



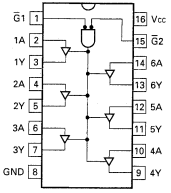
SN74ALS244BN



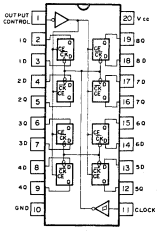
SN74LS245N
SN74ALS245AN
TC74HC245AP



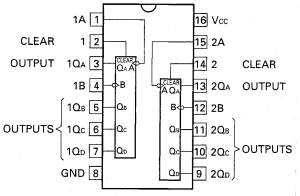
SN74ALS352N



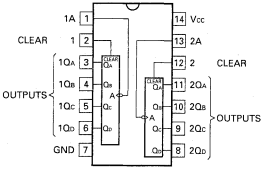
SN74LS365AN



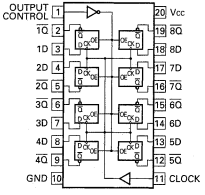
SN74ALS374AN



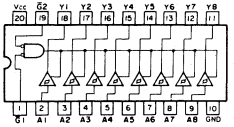
SN74LS390N



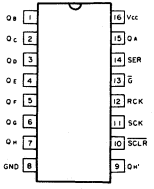
SN74LS393N



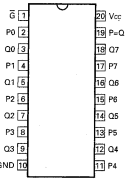
SN74ALS534AN



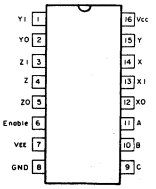
SN74ALS541N
SN74LS541N



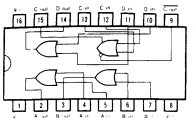
HD74HC595FP
HD74HC595AP
SN74LS595N



SN74ALS688N

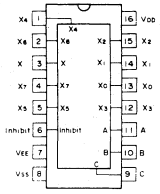


MC74HC4053N

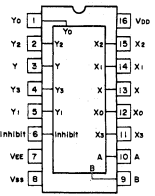


MC10103L

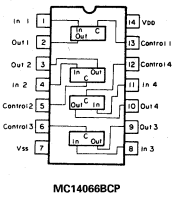
SEMICONDUCTORS



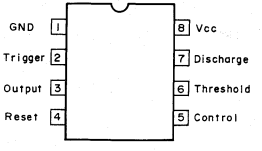
MC14051BCP



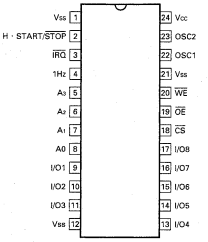
MC14052BCP



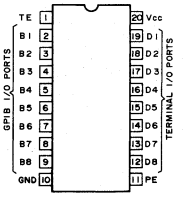
MC14066BCP



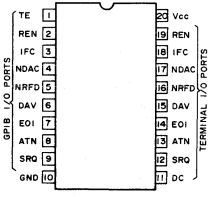
HA17555PS



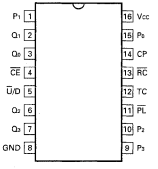
HD64610P



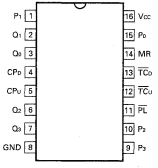
SN75160BN



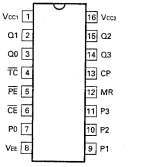
SN75161BN



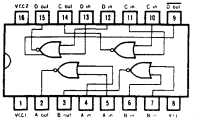
74F191PC



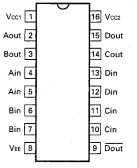
74F193PC



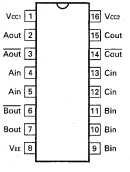
MC10H016L



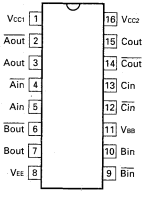
MC10H102L



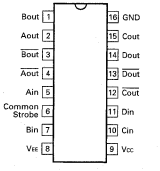
MC10H104L



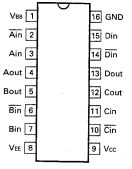
MC10H105L



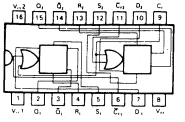
MC10H116M



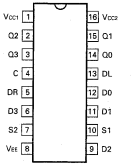
MC10H124L



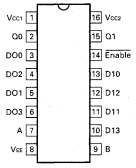
MC10H125L
MC10H125M



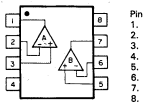
MC10H131L



MC10H141L

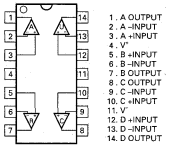


MC10H174L



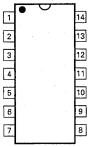
Pin name
1. A OUTPUT
2. A (−) INPUT
3. A (+) INPUT
4. V⁻
5. B (+) INPUT
6. B (−) INPUT
7. B OUTPUT
8. V⁺

NJMO72BD
NJM072BL

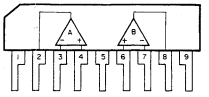


1. A OUTPUT
2. A -INPUT
3. A +INPUT
4. V⁺
5. B +INPUT
6. B -INPUT
7. B OUTPUT
8. C OUTPUT
9. C -INPUT
10. C +INPUT
11. V⁻
12. D +INPUT
13. D -INPUT
14. D OUTPUT

NJM074D

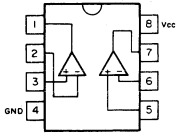


NJM556D

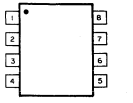


Pin name
1. V⁺
2. A OUTPUT
3. A − INPUT
4. A + INPUT
5. V⁻
6. B + INPUT
7. B − INPUT
8. B OUTPUT
9. V⁺

NJM4556L

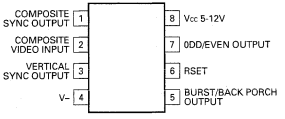


NJM4558D

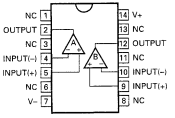


Pin name
1. GROUND
2. + INPUT
3. − INPUT
4. V⁻
5. BAL
6. BAL/STROBE
7. OUTPUT
8. V⁺

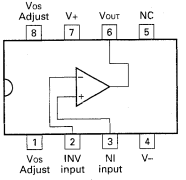
LM311N



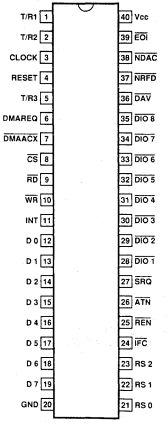
LN1881N



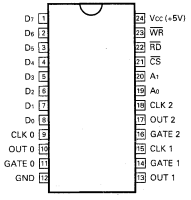
LM6218N



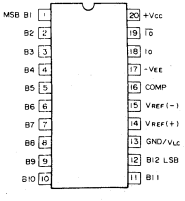
LM6364N



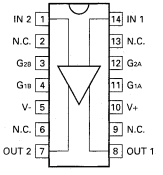
μPD7210C



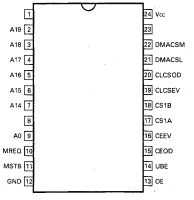
μPD8253C-2



HA17012PB

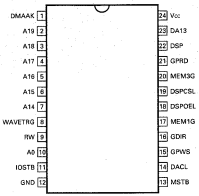


μA733CN

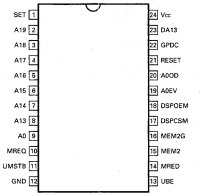


CTM6011

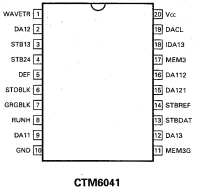
SEMICONDUCTORS



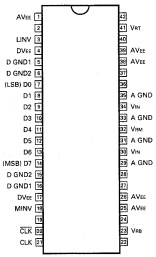
CTM6021



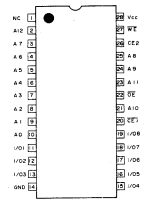
CTM6031



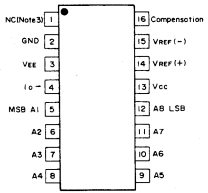
CTM6041



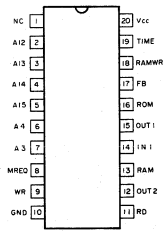
CXA1396D



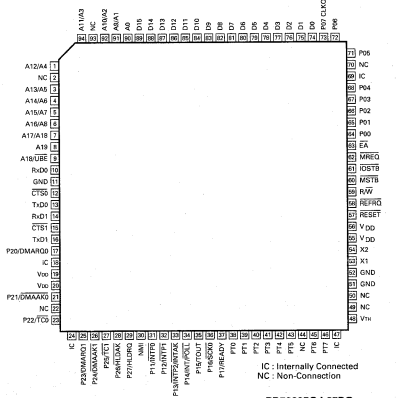
CXK5863M-25



DAC0808LCN

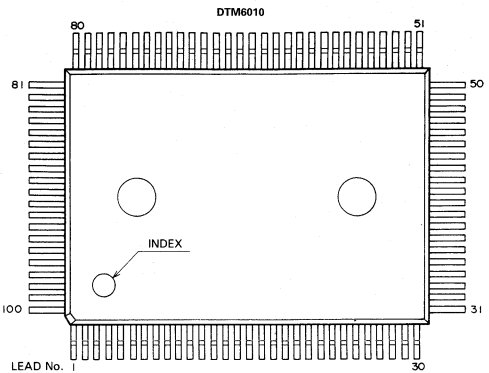


DTM-5010



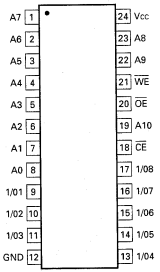
IC : Internally Connected
NC : Non-Connection

μPD70335GJ-85BG

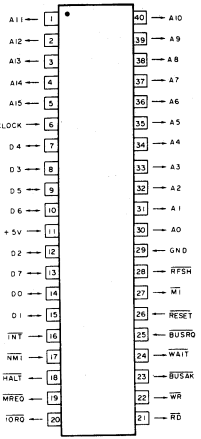


Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	CONT	26	TSD0	51	GETD	76	DD3
2	A13	27	TSD1	52	CA0	77	SING
3	VDD	28	VDD	53	VDD	78	VDD
4	A14	29	TSD2	54	CA4	79	R10M
5	A15	30	AX2	55	CA3	80	10M
6	INT0	31	AX1	56	CA2	81	HLDF
7	VX3	32	AX0	57	CA1	82	SGA
8	VX2	33	AX3	58	CD3	83	ROSP
9	VX1	34	HS2	59	CD2	84	ROD
10	VX0	35	HS1	60	CD4	85	HLDL
11	DA0	36	TDIO	61	CD1	86	ROUB
12	DA1	37	TWE	62	CD5	87	ROB
13	DA2	38	TCK1	63	DC4	88	ROQ
14	DA3	39	TST1	64	CD7	89	ROED
15	VSS	40	VSS	65	VSS	90	VSS
16	DA4	41	TST2	66	DC3	91	D7
17	DA5	42	TADD	67	DC2	92	D5
18	DA6	43	TCK2	68	CD6	93	D3
19	DA7	44	VS2	69	DC1	94	D1
20	DA8	45	VS1	70	DC0	95	ALE
21	DA9	46	VA0	71	CD0	96	D6
22	ROR	47	VA4	72	DD7	97	D4
23	ROA	48	VA3	73	DD6	98	D2
24	LEVX	49	VA2	74	DD5	99	D0
25	TCL	50	VA1	75	DD4	100	WR

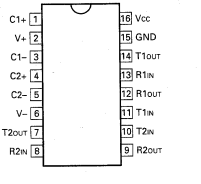
SEMICONDUCTORS



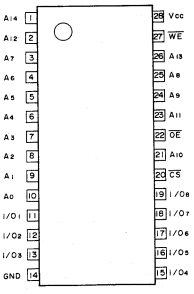
LC3517BS-15



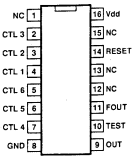
LH0080BF



MAX232EPE

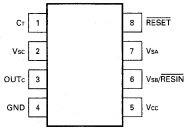


MB84256-10LL-SK

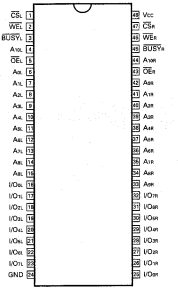


SPG-8650-0

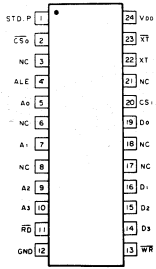
SEMICONDUCTORS



MB3771

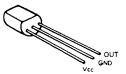


MB8422-12LP-G

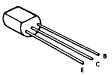


MB8464-10LL-SK

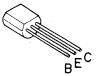
SEMICONDUCTORS



PST518B

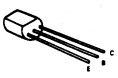


2SA684 (Q)
2SA1005 (K)
2SA1208 (S,T)
2SC1384 (Q)
2SC2910 (S,T)

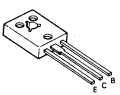


2SA1161
2SC3779 (D)

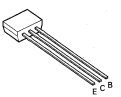
2SA1175 (F)
2SC2785 (F)
2SC3732 (L)



2SA1206 (K)

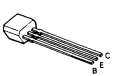


2SA1209 (S,T)
2SA1406 (E,F)
2SC2911 (S,T)
2SC3600 (E,F)

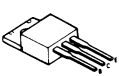


2SA1459
2SA1459 (K)
2SA1459 (L)

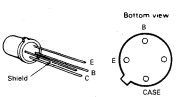
2SA1462 (Y34)



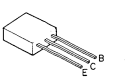
2SA1565
2SC4049



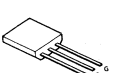
2SB1133 (R)
2SD613 (E)
2SD1666 (S)
2SD1666 (R)



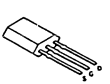
2SC1164 (D)*S



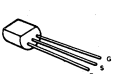
2SC3315 (C)
2SC3354 (S)
2SC3354 (S,T)



2SK241 (GR)



2SK304 (F)



2SK583-KEN